

COAL AGE

Volume 15

New York, April 17, 1919

Number 16

Some Further Thoughts on Labor

BY FLOYD W. PARSONS

IF anyone has ever believed in the unqualified control of business by the state, the case of the railroads in this country should at least bring a doubt to his mind. Our recent experience has caused many to decide that when politics comes in at the door economics goes out through the window.

In 1914 the average annual wages of the railroad employee was \$810. This year the average annual earnings of each employee will be at least \$1460. In the past three years nearly \$1,400,000,000 have been added to railroad wages, and in less than ten years the average increase has been upward of 120 per cent.

Although the Government has increased fares and rates more than a billion dollars, it has been unable to catch up with the wage increase. Rates must be raised at least another 20 per cent. if the railroad deficit is to be wiped out. In view of this wage situation it is no wonder that the holders of railroad securities are in no hurry to have the transportation lines turned back to private control.

The high prices for necessities are clearly due to the high wages paid to those who produce and distribute the things we use and consume. It is therefore vital that industry shall be again placed on a sound economic basis, and that the Nation's business shall not be used by any party as a pawn to curry political favor.

Notwithstanding the fact that American conditions differ considerably from those prevailing in Europe, our industrial history has shown that business in the United States has generally followed along the same paths trod by our cousins in Great Britain. Many American employers still hold views that were current in England four or five years ago. The British now recognize generally the

desirability of capital and labor bargaining collectively. In fact the English employer is decidedly in favor of the national union as opposed to a purely local works committee. Where shop committees do exist, the owners desire that such bodies come under the discipline of their unions. It is commonly recognized that this contributes to the stability of industry.

As for British employees, they are unanimous in their opposition to the use of force in attaining their aims. Almost none approves of a sudden change, as in Russia. The radicals among the workmen oppose collective bargaining on the ground that it fosters harmony, which they claim helps to continue the present system of society. But the majority of British workmen are of the conservative type, and although they are earnest in their desire to strengthen their unions, they are in accord with the employers in believing that it is best for the Nation if there is no restriction on output except as it affects the health of the employee. Most workmen also wish to leave control of business policies in the hands of those managing the business.

All of which leads to the conclusion that although we are entering a new era in industry, the leading nations are confronted by no problems that cannot be sagely met. Government ownership has been tried and valuable lessons have been learned. The loyalty and patriotism of workmen have been tested and sanity prevails among the great majority. Cooperation and conciliation are the national watchwords. Farseeing employers are not attempting to bring back pre-war conditions, and right-minded employees are commencing to recognize the danger to business from crowding labor's demands.

Let us, therefore, discard our blue glasses and see affairs in the full light of a new day.

IDEAS AND SUGGESTIONS

Responsibility of Labor

BY N. H. SEABURG
Boston, Mass.

Employers have always chafed under the industrial arrangement whereby labor is given power without responsibility. It has been their most grievous complaint against and objection to collective bargaining, because even the state must bend to the wishes of labor—be those wishes right or wrong—if it but exerts its full power. Several concrete illustrations in support of this latter statement have been afforded during the past two years, and employers are more confirmed than ever in their conviction that there is no court of appeal to which they may carry their cases against labor. Labor, they argue, has placed itself above the state.

During the troublesome times just past, employers were unanimous in their oft-repeated assertion that "Labor can get anything it wants in Washington these days." More recent developments have not caused them to change that opinion, and consequently employers are sorely depressed by the outlook. In the coal industry, with its great labor problem, the extent to which labor has Washington under its thumb may be put to the test should there be a general strike. A strike, however, at this time would be no serious calamity to the operator. On the contrary, it would relieve him of much anxiety, principally that of trying to keep his men working a few days a week, if possible, under the present discouraging conditions. The great danger of a clash today lies in the potential effect it may have upon the future industrial peace of the operator and miner. On both sides seeds of bitterness may be sown that may ripen into disaster sooner or later.

Like war, strikes are destructive and in that sense are wasteful to an industry. It is a shortsighted policy to dam up at considerable expense the small loopholes of waste in business and leave the front door wide open for its entrance. Labor is the front door in the coal business, and to keep it safely and securely closed today the operators must take cognizance of the change which labor has undergone.

Perhaps the most confusing demand that the miners may make of the operator today is their desire as growing human beings to have a voice in the management. Throughout the labor world this ambition has long been smoldering, but it has never before now crystallized into an actual demand. The English employer is face to face with it, as, of course, is also disrupted Russia. It is a desire international in demand. Superficial consideration of this new problem may possibly arouse the fighting instinct in many employers, but when subjected to the calm test of reason it will not seem so destructive in character.

Employers, as remarked before, have always bemoaned labor's power without responsibility. Instead of trying to break that power, as some employers have done and are doing, the best way to remedy it is to increase labor's responsibility. Responsibility is a

stern policeman, and is far more effective than mere authority. Possibly, therefore, in this new ambition of the workers for a place in the management the employer may find his salvation, as it will mean sharing his responsibilities with his workers.

This course would be of particular advantage in a period like the present, when the miners, through their councils or committees, would be kept fully informed of the depressed status of the market. Knowing the truth about conditions, they would be apt to mark time as best they could, realizing that the operators were not any more responsible than they themselves. So, too, they could be educated and kept informed on all other phases of the industry which might affect their work from time to time.

It is true that operators could carry on this task of enlightenment just as well without a miners' council or committee, but it would not have the confidence of the workers. The latter cannot, on the other hand, doubt the information their own representatives would furnish them. Thus, by an intelligent understanding of their industry the workers would be in a better position to judge of the reasonableness and justice of the demands they might make upon their employer. Local disputes and questions of every kind could also be settled by these councils without recourse to a national upheaval.

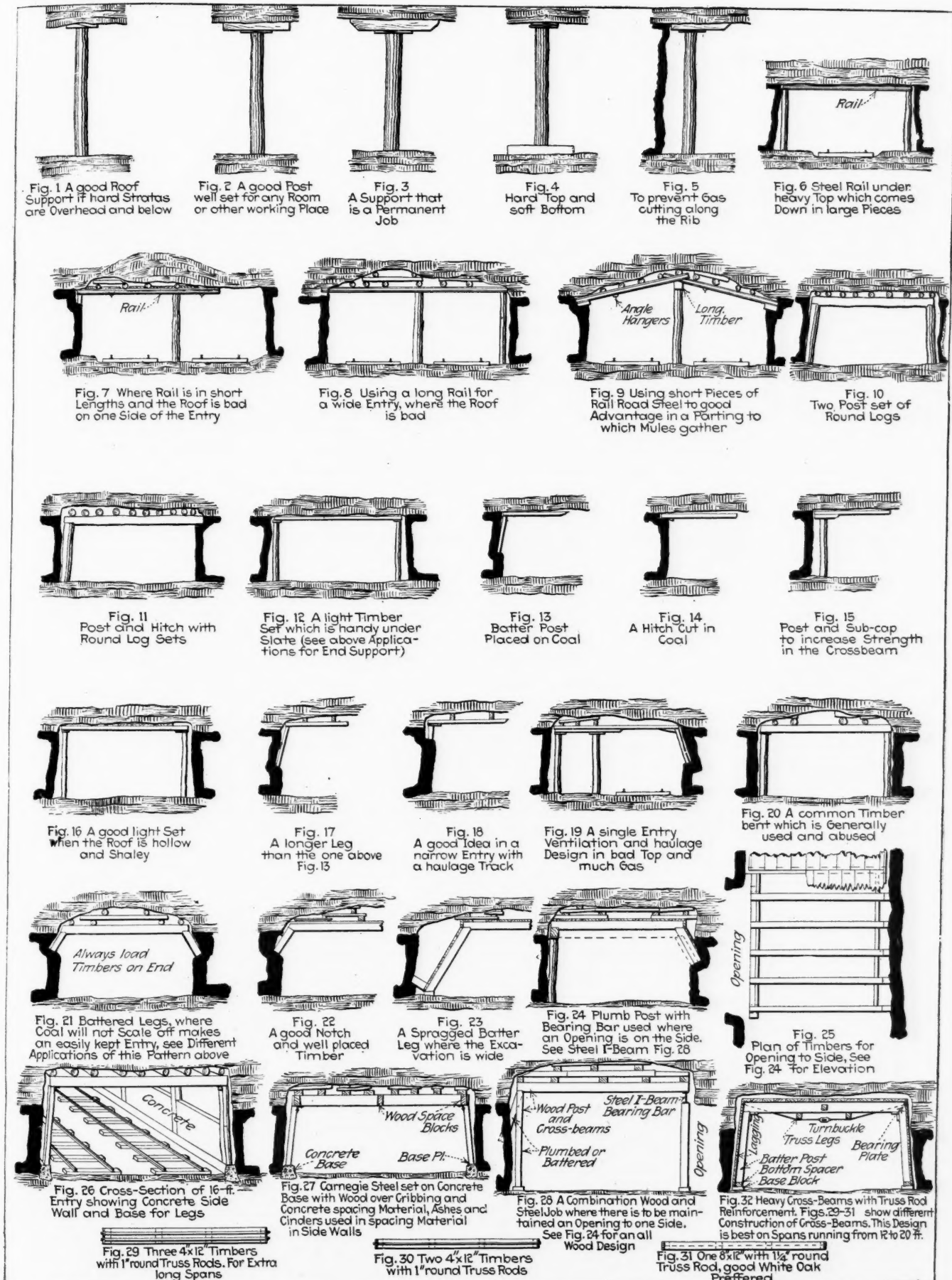
The old belief that neither side can gain except at the expense of the other should be relegated to the dumping grounds for myths. While they have many interests that are entirely different, yet they have so much in common that coöperation and not conflict should be the basis of their relations. And if this is so, why should labor not bear its share of the responsibilities? Labor's power would then also be the employer's power, their interests being mutual.

Various Timbering Methods

BY M. M. HALEY
Sturgis, Ky.

In the "Ideas and Suggestions" department of *Coal Age*, Feb. 20, appeared an excellent article on mine timbering by Joseph R. Thomas, of Plymouth, Penn. Some time ago I had made what might be termed a suggestion sheet on methods of timbering. This sheet I had blueprinted and distributed to all timbermen and others interested in or charged with the upkeep of the mines. Such drawings are always welcome to those who are ambitious and anxious to improve mining conditions or the quality of their own workmanship.

No hard or fast rules can be applied to any or every set of conditions, and the experience and good judgment of the timberman must always be relied on if the best results are to be obtained. The sheet shown on the facing page therefore contains suggestions, but not rules or instructions, for almost any contingency likely to be encountered in timbering in actual mining practice. The idea is merely an adaptation to the mine of methods in everyday use in shops and factories.



This Suggestion Sheet on Methods of Timbering Brought Increased Effectiveness
on the Part of the Men

Fusibility of Ash from Coals Found in the Interior Province*

BY W. A. SELVIG, W. C. RATLIFF AND A. C. FIELDNER

Fuels Chemical Laboratory, U. S. Bureau of Mines,
Pittsburgh, Penn.

SYNOPSIS—*Coals from the various states in the Interior Province, with the exception of those from Iowa and Michigan, not yet tested, show a great similarity in the fusibility of their ash content. Results obtained in the laboratory may not coincide with those secured in the boiler furnace, but the method of test followed was selected as giving a close approximation to the results that might be expected in the ordinary commercial consumption of the coals tested.*

THE Interior Coal Province, which includes all of the bituminous coal fields near the Great Lakes, in the Mississippi Valley proper, and in Texas, contains a vast amount of coal which is extensively mined and has been an important factor in the development of the great manufacturing centers of this region.

While there is a large amount of analytical data available as to the composition of these coals¹ there has been no general survey of the fusibility of ash from the various coal beds comprising this great coal province.

The fusibility of the ash is of great interest to the consumer of coal, principally in connection with the formation of clinker due to the melting of the ash constituents of the coal when fired under boilers. The Bureau of Mines is therefore making fusibility tests on the well-known American coals, and this paper includes a table giving results for coal from each mine tested in the Interior Province. A previous paper² gave a description of the standard gas-furnace method used by the Bureau of Mines in making ash fusibility tests, together with a complete table giving results obtained for the coal from each mine tested in West Virginia.

It is well to bear in mind that fusibility tests as made in the laboratory are not directly comparable to the conditions existing when coal is burned in a furnace. In a laboratory test the impurities remaining as ash are intimately mixed. Obviously, there is no such uniform distribution when the coal is burned in the ordinary manner. Fieldner, Hall and Feild³ have shown that in a laboratory fusibility test various

factors have a great influence on the results obtained. The standard gas-furnace method as used for the tests takes into consideration the different factors influencing the results obtained, with special reference to the atmosphere surrounding the ash during the test. With this method the atmosphere in which the ash is heated is readily controlled by burning an excess of gas, under which condition a reducing atmosphere is obtained. This reduces the iron in the ash to the ferrous state and gives the lowest temperature at which clinkering may result.

This is of special importance in testing ash from coals of the Interior Province, as they contain a relatively large amount of iron in the form of pyrite. Consequently, higher softening temperatures may be expected in tests using oxidizing atmospheres by which the iron would be oxidized to ferric oxide, or in tests using strongly reducing atmospheres by which the iron would be largely reduced to the metallic state. In both of these conditions a more refractory and viscous slag is formed than would result if the atmosphere were such as to reduce the iron in the ash to the ferrous state, which gives the most fusible condition.

Analyses of clinkers from boiler furnaces indicated that the conditions were such as to form clinkers in which the iron is present principally in the ferrous state, consequently the values obtained in the laboratory tests are in this respect comparable to the actual fuel-bed conditions, and give the lowest temperatures at which the intimately mixed ash will soften with the formation of clinker.

INTERPRETATION OF FUSIBILITY TABLE

The states comprising the Interior Coal Province are arranged according to the coal region in which they belong; the eastern region (Illinois, Indiana and western Kentucky); the western region (Kansas, Missouri, Oklahoma and Arkansas); and the southwestern region (Texas). Michigan and Iowa, which are included in the Interior Province, are not represented in the table as no mine samples of coals from these states were available when the tests were made. Under each state the tabulation is alphabetical according to bed, county, town and mine.

The samples represented are practically all standard mine samples collected by representatives of the Bureau of Mines, the U. S. Geological Survey, or by the various state geological surveys, according to the methods used by the Bureau of Mines.⁴ A small number of car samples which were considered representative of the output of the various mines were also included.

The number of samples from each mine, the lowest, highest and average softening temperatures in deg. F.,

*Published by permission of the Director of the U. S. Bureau of Mines.

¹Lord, N. W., and others: Analyses of Coals in the United States, with Descriptions of Mine and Field Samples Collected Between July 1, 1904, and June 30, 1910; Bull. 22, Bureau of Mines, 1913, 1200 pp. (In two parts.)

²Fieldner, A. C., and others: Analyses of Mine and Car Samples Collected in the Fiscal Years 1911 to 1913; Bull. 85, Bureau of Mines, 1914, 444 pp.

³Fieldner, A. C., and others: Analyses of Mine and Car Samples Collected in the Fiscal Years 1913 to 1915; Bull. 123, Bureau of Mines, 1917, 456 pp.

⁴Farr, S. W.: Chemical Study of Illinois Coals; Illinois State Geological Survey, Coal Mining Investigations; Bull. 3, 1916, 86 pp.

⁵Selvig, Walter A.: Fusibility of Coal Ash from West Virginia Coals; *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.

⁶Fieldner, A. C., Hall, A. E. and Feild, A. L.: The Fusibility of Coal Ash and the Determination of the softening Temperature; Bull. 129, Bureau of Mines, 1918, 146 pp.

⁷Holmes, J. A.: The Sampling of Coal in the Mine; Technical Paper 1, Bureau of Mines, 1911, 18 pp.

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE

Locality, Bed, Etc.				Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
					Lowest	Highest	Average	Ash	Sulphur
1				2	3	4	5	6	7
EASTERN REGION—ILLINOIS									
No. 1 Bed									
County	Town	Mine							
Mercer	Matherville	Alden No. 7		6	2040	2180	2110	11.74	4.86
No. 2 Bed									
Bureau	Cherry	Cherry No. 2		2	1880	1930	1910	8.97	4.51
Bureau	Marquette	Marquette No. 1		3	1990	2130	2050	8.99	2.75
Grundy	Coal City	Wilmington Star No. 7		1			1880	6.71	2.96
McLean	Bloomington	Bloomington		5	1960	2030	2000	10.82	3.32
McDonough	Industry	Burdick County Bank		2	2140	2240	2190	7.55	3.26
McDonough	Plymouth	Stoneking		2	1970	2120	2050	6.76	3.68
Average of mines in No. 2 Bed				15	1990	2090	2010	9.97	3.58
No. 5 Bed									
Fulton	Cuba	Big Creek No. 3		2	1890	1960	1930	13.21	3.62
Fulton	St. David	Big Creek No. 2		5	1890	1970	1930	12.87	3.56
Gallatin	Shawneetown	Middle mine of Saline mines		1			2010	8.55	2.91
Menard	Athens	Wabash No. 2		2	1880	1970	1930	11.47	3.44
Peoria	Bartonville	Collier		3	1900	1970	1950	11.61	3.35
Peoria	Hanna City	Hanna City		4	1910	2030	1950	13.72	3.42
Saline	Harrisburg	O'Gara No. 4		2	2020	2020	2020	7.87	2.92
Saline	Harrisburg	O'Gara No. 9		7	1960	2210	2090	7.94	2.15
Saline	Grayson	Saline County No. 6		1			2060	10.28	4.14
Average of mines in No. 5 Bed				27	1920	2020	1990	10.84	3.28
No. 6 Bed									
Christian	Pana	Springside		4	1920	2090	2000	11.37	4.58
Franklin	Buckner	No. 2		6	2080	2300	2190	9.35	1.17
Franklin	Bush	Bush No. 2		4	1920	2000	1950	11.26	3.61
Franklin	Christopher	Old Ben No. 11		4	2080	2390	2270	8.68	0.88
Franklin	Christopher	United No. 1		5	2240	2440	2290	9.20	1.03
Franklin	Christopher	Old Ben No. 10		6	2220	2530	2380	9.54	0.84
Franklin	Herrin	Possum Ridge		4	2050	2320	2210	8.39	0.82
Franklin	Orient	Orient		2	2380	2440	2410	8.99	0.93
Franklin	Orient	Orient (car sample, lump over 3 inches)		2	2120	2260	2190	9.73	1.29
Franklin	Royalton	North		6	2170	2650	2420	10.22	0.76
Franklin	Sesser	Sesser No. 1		5	2130	2260	2210	9.30	1.21
Franklin	Sesser	Sesser No. 1 (car sample of 3-in. lump coal)		4	2190	2480	2360	9.84	1.22
Franklin	West Frankfort	Brazil Block No. 18		2	2150	2240	2200	8.42	2.00
Franklin	West Frankfort	Old Ben No. 8		3	2010	2170	2070	7.93	1.45
Franklin	West Frankfort	Old Ben No. 9		4	2030	2150	2080	8.68	1.50
Franklin	West Frankfort	West Frankfort No. 1		5	2140	2520	2260	8.82	1.14
Gallatin	Shawneetown	Strong		1			2060	9.77	3.15
Macoupin	Gillespie	Superior No. 1		2	2140	2160	2150	11.36	4.59
Macoupin	Gillespie	Superior No. 1 (car sample run-of-mine)		1			2040	15.11	5.76
Madison	Collinsville	Cantine No. 3		3	1970	2020	1990	10.67	4.01
Montgomery	Panama	Shoal Creek No. 1		6	2010	2170	2060	13.49	4.54
Perry	Duquoin	Paradise		18	2330	2610	2490	11.18	1.00
Perry	Duquoin	Security		4	2050	2130	2090	10.50	1.70
Perry	Pinckneyville	Ritchey No. 1		5	1920	2170	2060	11.46	3.65
St. Clair	O'Fallon	Taylor		2	1960	2030	2000	12.70	5.04
Vermillion	Danville	Schaefer		4	1990	2170	2090	10.19	3.85
Vermillion	Fairmont	Fairmont		6	1950	2150	2050	11.78	2.76
Vermillion	Georgetown	Sharon		5	2070	2160	2100	12.76	2.61
Vermillion	Steelton	Dering No. 4		8	2040	2190	2110	10.53	2.53
Vermillion	Westville	Bunsen (car sample, nut coal)		1			2180	10.45	1.99
Vermillion	Westville	Bunsen No. 3		1			1940	11.93	3.74
Vermillion	Westville	Little Vermillion		12	1930	2160	2070	9.84	2.52
Williamson	Herrin	Pond Creek		4	2010	2430	2220	9.43	1.01
Williamson	Herrin	Jeffrey		3	2220	2350	2280	8.26	1.38
Williamson	Herrin	Rend No. 2		5	2230	2390	2300	8.88	1.08
Williamson	Herrin	Weaver No. 2		3	1950	2280	2140	9.74	1.41
Average of mines in No. 6 Bed				160	2080	2280	2160	10.27	2.30
No. 7 Bed									
Vermillion	Danville	Electric		12	1940	2180	2040	9.70	3.31
Williamson	Herrin	C. and H. (car sample, run-of-mine coal)		1			2060	11.53	2.06
Average of mines in No. 7 Bed				13	1940	2180	2050	10.62	2.69
INDIANA									
No. 3 Bed									
Vermillion	Clinton	Crown Hill No. 3		4	2040	2220	2140	9.92	3.64
Vermillion	Clinton	Dering No. 1		4	1990	2070	2050	9.83	3.86
Vigo	Terre Haute	Vandalia No. 82		3	2030	2100	2080	12.08	5.51
Average of mines in No. 3 Bed				11	2020	2130	2090	10.61	4.34
No. 4 Bed									
Greene	Jasonville	Gilmour No. 7		4	2570	2790	2670	8.43	1.33
Greene	Linton	Vandalia No. 24		3	2370	2710	2500	8.30	1.49
Sullivan	Cass	Vandalia No. 28		3	2300	2420	2350	7.81	1.43
Sullivan	Dugger	Ayrdaie		4	2350	2710	2490	8.20	1.42
Sullivan	Dugger	Vandalia No. 10		9	2150	2390	2300	7.01	1.45
Sullivan	Dugger	Vandalia No. 22		3	2030	2340	2170	8.91	2.93
Vermillion	Clinton	Clinton No. 4		4	2250	2320	2280	8.50	1.26
Average of mines in No. 4 Bed				30	2290	2530	2390	8.17	1.62
No. 5 Bed									
Gibson	Fort Branch	Fort Branch		3	2060	2100	2080	9.72	3.83
Gibson	Oakland City	Ayrshire No. 7 (car sample, lump coal)		4	2480	2560	2530	6.40	1.06
Knox	Bicknell	Indian Creek		2	2040	2210	2130	10.28	4.83
Knox	Bruceville	Oliphant Johnson No. 1		6	2030	2130	2070	11.90	3.54
Sullivan	Carlisle	Viola		3	1990	2200	2090	10.29	3.27
Vanderburg	Evansville	Sunnyside		2	2080	2100	2090	10.31	2.97
Vermillion	Blanford	West Clinton No. 1		2	1890	2070	1980	10.49	3.65
Vigo	Terre Haute	Vandalia No. 82		6	1950	2090	2040	10.82	3.45
Warrick	Elberfield	Elberfield		1			2190	11.83	5.30
Average of mines in No. 5 Bed				29	2070	2180	2130	10.23	3.54
No. 6 Bed									
Sullivan	Dugger	Vandalia No. 17		5	2010	2120	2040	9.91	2.65
Minshall Bed									
Vigo	Coal Bluff	Chicago No. 8		1			2120	9.60	2.99

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.				Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
					Lowest	Highest	Average	Ash	Sulphur
1				2	3	4	5	6	7
WESTERN KENTUCKY									
No. 6 Bed									
County	Town	Mine							
Union	Sturgis	Crittenden		4	1990	2260	2130	8.81	2.97
No. 9 Bed									
Daviess	Owensboro	Fulkerson		2	2030	2080	2060	12.18	4.31
Daviess	Owensboro	George Rudy		3	2060	2190	2100	10.76	3.63
Henderson	Baskett	No. 1		3	2020	2100	2050	11.53	3.14
Henderson	Robards	Panama		2	1990	2070	2030	11.41	4.12
Hopkins	Earlington	Arnold No. 9		8	1980	2310	2090	9.96	3.78
Hopkins	St. Charles	Carbondale No. 1		6	1910	2190	2020	9.05	3.59
Hopkins	St. Charles	Fox Run		8	1930	2170	2030	10.03	3.43
McLean	Island	O'Neil		4	1980	2170	2090	10.62	3.48
Muhlenburg	Bevier	Lam		5	1870	2030	1950	9.83	3.98
Muhlenburg	Central City	Central		3	1970	2230	2090	8.34	2.87
Muhlenburg	Cleaton	Bevier		2	1930	1960	1950	10.41	3.05
Muhlenburg	Graham	Skibo		2	1970	2030	2000	10.20	3.76
Ohio	McHenry	McHenry		1			2120	9.51	2.91
Ohio	Rockport	Crown		5	2000	2120	2070	10.79	3.70
Union	Dekoven	Curlew		1			2000	9.69	3.63
Union	Dekoven	Ohio Valley		6	1990	2070	2020	12.32	3.76
Union	Sturgis	West Kentucky No. 8		5	1920	2050	1980	11.62	4.19
Union	Sturgis	West Kentucky No. 9		4	1980	2000	1990	10.62	4.03
Webster	Providence	Providence No. 3		6	1870	2100	1990	10.55	4.17
Webster	Sebree	Sebree		2	1810	2020	1920	11.09	3.86
Average of mines in No. 9 Bed				78	1960	2110	2030	10.53	3.67
No. 10 Bed									
Union	Dekoven	Banks		1			1970	12.56	4.18
Union	Dekoven	Syres		1			2010	11.42	4.1
Average of mines in No. 10 Bed				2			1990	11.99	4.1
No. 11 Bed									
Hopkins	Madisonville	Reinecke		9	1960	2310	2070	7.95	4.00
Hopkins	Nortonville	Norton No. 1		6	1950	2130	2040	7.46	3.77
Union	Morganfield	Morganfield		4	1840	2230	2020	11.06	4.46
Union	Spring Grove	Buchanan		1			1990	9.99	4.02
Union	Uniontown	River Rail		5	1880	2050	1970	10.33	3.96
Webster	Providence	Shamrock		9	1880	2110	1970	9.77	4.24
Webster	Wheatcroft	West Kentucky No. 4		5	2020	2390	2160	10.45	4.14
Average of mines in No. 11 Bed				39	1920	2200	2030	9.57	4.08
No. 12 Bed									
Henderson	Corydon	Corydon		4	1860	2030	1970	12.72	3.39
Henderson	Smith Mills	Smith Mills		4	1990	2140	2070	9.41	2.03
Webster	Clay	West Kentucky No. 7		9	2080	2720	2410	8.47	1.49
Average of mines in No. 12 Bed				17	1980	2300	2150	10.20	2.30
Miscellaneous Beds									
Butler	Morgantown	Gilliam (Country Bank, bed not classified)		2	2020	2180	2100	8.33	3.71
Christian	Empire	Empire (Empire Bed)		3	1880	1960	1920	5.10	2.31
Crittenden	Sullivan	Barnaby (Bed not named, Bell?)		1			2160	8.05	3.59
Crittenden	Sullivan	Newcome (Bed not named)		1			2220	7.11	3.59
Hopkins	Nebo	Nebo (No. 14 Bed)		6	1900	2380	2070	9.17	3.02
Hopkins	Dawson Springs	Workman (Dawson Bed)		4	2000	2250	2100	5.49	3.11
WESTERN REGION—KANSAS									
Bevier Bed									
Leavenworth	Lansing	Penitentiary		3	1970	2070	2030	14.08	4.47
Leavenworth	Leavenworth	Home Riverside No. 1		3	1810	2020	1920	15.58	4.95
Average of mines in Bevier Bed				6	1890	2050	1980	14.83	4.71
Cherokee Bed									
Cherokee		Mayer No. 9		4	1900	2000	1950	8.72	3.30
Crawford	Edison	Wear No. 21		1			2090	12.65	5.04
Crawford	Pittsburgh	Central (Strip Pit)		3	2170	2390	2280	6.89	1.19
Average of mines in Cherokee Bed				8	2040	2200	2110	9.42	3.18
Leavenworth Bed									
Leavenworth	Leavenworth	Home Riverside No. 3		3	1860	2120	2020	18.26	5.46
Weir-Pittsburgh Bed									
Crawford	Fuller	Sheridan No. 2		3	1950	2110	2050	9.56	5.23
Crawford	Franklin	Western No. 16		1			1970	12.67	5.63
Crawford	Yale	Western No. 13		3	2000	2040	2020	12.81	5.08
Average of mines in Weir-Pittsburgh Bed				7	1980	2080	2010	11.68	5.31
Miscellaneous									
Crawford	Pittsburgh	Patton (Bed unnamed, upper bed)		1			1920	13.56	3.45
MISSOURI									
Bevier Bed									
Adair	Connellsville	Manufacturers No. 1		3	1870	2100	1980	14.96	4.10
Adair	Kirksville	Rocky Ford No. 1		2	1980	2030	2010	16.11	4.35
Adair	Kirksville	Star No. 1		2	1940	1950	1950	15.44	6.13
Adair	Novinger	Great Northern No. 21		3	1920	1980	1960	11.97	4.17
Adair	Novinger	Rombauer No. 3		3	1870	1950	1910	13.96	3.56
Boone	Columbia	Davis & Watson No. 1		3	1900	1950	1930	11.51	4.57
Boone	Columbia	Prather No. 1		3	1930	1970	1950	14.79	5.55
Caldwell	Hamilton	Caldwell No. 1		1			1930	16.44	6.65
Callaway	Fulton	Fulton Firebrick No. 1		3	1980	2000	1990	11.74	4.42
Johnson	Sutherland	Sutherland No. 1		2	1890	2060	1980	9.07	4.44
Macon	Bevier	Central No. 61		3	1940	2090	2030	11.27	3.83
Macon	Bevier	Northwestern No. 9		3	1920	1990	1950	11.12	4.05
Randolph	Huntsville	Carson No. 1		3	1960	1980	1970	11.67	6.11
Randolph	Huntsville	Northern Central No. 2		3	1960	1990	1970	9.95	4.46
Randolph	Ryder	Jones No. 1		3	1830	1910	1880	16.01	5.20
Sullivan	Milan	Milan No. 1		2	1850	1960	1910	19.49	6.85
Average of mines in Bevier Bed				42	1920	1990	1960	13.47	4.90
Bowen Bed									
Henry	Windsor	Bowen No. 4		3	1920	1960	1940	13.18	4.61

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.				Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
					Lowest	Highest	Average	Ash	Sulphur
1				2	3	4	5	6	7
WESTERN REGION—MISSOURI—Continued									
Gainsville Bed									
County	Town		Mine						
Harrison	Cainsville		Cainsville	3	1940	2030	1980	12.71	5.78
Cherokee Bed									
Barton	Pittsburg, Kansas		Stephenson	3	2020	2260	2150	7.51	1.97
Jordan Bed									
Henry	Clinton		Pharis No. 1	3	1970	2160	2090	12.20	2.86
Henry	Clinton		Sheldon & Holt No. 1	3	1980	2010	1990	12.88	5.99
Henry	Deepwater		Dickey No. 1	3	1990	2040	2020	11.22	4.01
Henry	Deepwater		Hurst No. 1	3	1940	1970	1950	14.65	4.81
Average of mines in Jordan Bed				12	1970	2050	2010	12.74	4.42
Lexington Bed									
Adair	Stahl		Consolidated Stahl No. 1	2	1950	1960	1960	14.62	4.62
Clay	Missouri City		Missouri City No. 1	2	1980	2030	2010	14.78	3.50
Harrison	Melbourne		Trenton No. 1	3	1950	1990	1970	7.84	3.52
Lafayette	Corder		Black Diamond	3	1960	1980	1970	13.00	5.13
Lafayette	Corder		Wilson	3	1950	1980	1970	13.25	3.94
Lafayette	Higginsville		Farmers No. 1	3	2000	2120	2040	19.02	3.76
Lafayette	Lexington		Graddy	3	1930	2070	1990	15.00	3.90
Lafayette	Napoleon		Independence	3	1990	1990	1990	16.59	3.71
Lafayette	Wellington		Labor Exchange, Branch 305	3	1990	2070	2040	11.54	3.51
Putnam	Mendota		Mendota No. 2	3	1900	1940	1930	12.05	5.05
Putnam	Unionville		Anderson	2	2030	2100	2070	13.84	3.76
Ray	Richmond		Ray County No. 2	3	1930	2140	2040	15.84	4.49
Ray	Richmond		Ray County No. 50	3	1990	2030	2010	13.39	4.49
Ray	Vibbard		Vibbard No. 1	3	1990	2220	2070	7.91	3.14
Average of mines in Lexington Bed				39	1970	2040	2000	13.48	4.04
Lower Rich Hill Bed									
Bates	New Home		New Home No. 1	3	1890	1900	1900	16.04	5.59
Bates	Rich Hill		Fleming Pit No. 1	3	1950	2000	1980	13.70	5.46
Bates	Rich Hill		Ritchie Pit No. 1	2	1920	1970	1950	16.43	5.24
Average of mines in Lower Rich Hill Bed				8	1920	1960	1940	15.39	5.43
Lower Weir-Pittsburg Bed									
Barton	Mindenmines		Pullen No. 1	3	1920	1980	1960	9.51	3.72
Barton	Mindenmines		Pullen No. 17	3	1900	1940	1920	12.14	5.17
Average of mines in Lower Weir-Pittsburg Bed				6	1910	1960	1940	10.78	4.45
Mulberry Bed									
Bates	Amsterdam		Amsterdam No. 1	3	1940	1980	1960	16.19	4.30
Bates	Hume		Holland No. 1	2	1940	2070	2010	12.96	2.05
Average of mines in Mulberry Bed				5	1940	2030	1990	14.58	3.18
Mulky Bed									
Audrain	Martinsburg		Martinsburg No. 1	1			1940	11.66	5.77
Audrain	Vandalia		Standard	3	1890	1970	1920	13.68	5.41
Macon	Macon		Home	2	1950	2100	1980	10.53	4.66
Randolph	Renick		Orris No. 1	3	1870	1930	1910	9.23	5.14
Average of mines in Mulky Bed				9	1900	2000	1940	11.28	5.25
Rich Hill Bed									
Vernon	Panama		Jones No. 1	3	1930	1990	1970	15.47	6.12
Tebos Bed									
Adair	Kirkville		Star	2	1990	2010	2000	11.07	5.91
Grundy	Trenton		Trenton No. 3	3	2140	2320	2260	13.64	3.61
Henry	Calhoun		Parks No. 1	3	1920	2010	1970	12.87	4.01
Henry	Clinton		Lane No. 1	3	1950	2080	2000	14.50	4.28
Henry	Lewis		Pigg No. 1	3	1960	2010	1980	14.24	4.54
Linn	Brookfield		Crandall No. 1	3	1950	2160	2040	9.51	4.97
Linn	Brookfield		Walker No. 1	3	1930	2200	2040	8.82	5.12
Linn	Marceline		Landreth No. 1	3	1960	2040	2000	8.49	4.86
Average of mines in Tebos Bed				23	1980	2100	2040	11.64	4.66
Waverly Bed									
Lafayette	Waverly		Buckhorn	2	2010	2030	2020	17.43	8.29
OKLAHOMA Dawson Bed									
Rogers	Collinsville		New State Strip Pit	1			1860	8.73	4.09
Tulsa	Dawson		Southwestern No. 1	1			1920	9.36	3.62
Tulsa	Tulsa		Hickory No. 2	1			1970	8.75	4.01
Average of mines in Dawson Bed				3			1920	8.95	3.91
Henryetta Bed									
Okmulgee	Henryetta		Creek	1			1960	9.34	1.59
Okmulgee	Henryetta		Victoria	1			2000	6.72	1.59
Average of mines in Henryetta Bed				2			1980	8.03	1.59
Lehigh Coal Bed									
Coal	Lehigh		Folsom Morris No. 5	5	1950	2230	2120	12.89	4.56
Coal	Lehigh		Folsom Morris No. 8	5	1970	2240	2150	12.20	4.19
Coal	Phillips		Folsom Morris No. 6	5	2110	2240	2190	9.30	3.76
Average of mines in Lehigh Coal Bed				15	2010	2240	2150	11.46	4.17
Lower Hartshorne Bed									
Latimer	Adamson		Adamson No. 6	2	1920	1990	1960	3.21	1.38
Latimer	Gowen		Rock Island No. 40	7	1910	2070	2030	6.86	1.45
Le Flore	Hughes		Turkey Creek No. 2	1			2050	6.46	0.89
Le Flore	Williams		Williams No. 1	5	1870	2020	1970	8.85	1.02
Pittsburg	Adamson		Eclipse No. 1	2	2030	2060	2050	4.16	1.42
Pittsburg	Haileyville		Blue Creek No. 7	2	2000	2060	2030	6.02	0.31
Pittsburg	Hartshorne		Rock Island No. 8	2	1990	2030	2010	5.79	1.84
Pittsburg	Pocahontas		Pocahontas No. 1	1			2030	5.12	0.81
Pittsburg	Ridgeway		Rock Island No. 10	5	1980	2120	2050	7.77	1.70
Average of mines in Lower Hartshorne Bed				27	1960	2050	2020	6.03	1.43

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.				Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
					Lowest	Highest	Average	Ash	Sulphur
I				2	3	4	5	6	7
WESTERN REGION—OKLAHOMA—Continued									
McAlester Bed									
County	Town	Mine							
Coal	Lehigh	Lehigh No. 8		1			2160	11.66	3.92
Pittsburg	Alderson	Rock Island No. 5		10	2030	2290	2190	4.92	0.71
Pittsburg	Alderson	Rock Island No. 38		8	1950	2160	2090	5.28	0.56
Pittsburg	Craig	Bolen-Darnall No. 4		2	2200	2290	2250	5.39	0.87
Pittsburg	McAlester	Busby No. 5		6	2190	2270	2230	5.40	0.58
Pittsburg	Pittsburg	McAlester Edwards No. 1		1			2180	8.97	3.38
Average of mines in McAlester Bed				28	2090	2250	2180	6.94	1.67
McCurtain Bed									
Haskell	McCurtain	San Bois No. 2		6	1990	2220	2110	6.92	0.84
Panama Bed									
Haskell	McCurtain	Blue Ridge No. 4		2	2130	2250	2190	6.13	1.01
Haskell	McCurtain	Blue Ridge No. 5		2	2100	2140	2120	7.49	0.91
Average of mines in Panama Bed				4	2120	2200	2160	6.81	1.46
Stigler Bed									
Haskell	Stigler	Turner Strip Pit		1			1940	4.00	0.64
Haskell	Stigler	Strip Pit		1			2050	4.69	0.71
Haskell	Stigler	Strip Pit		1			2090	2.62	0.65
Haskell	Tamaha	Old Slope		1			1920	8.09	3.60
Haskell	Tamaha	Strip Pit		1			2250	6.25	3.95
Average of mines in Stigler Bed				5			2050	5.13	1.91
Upper Hartshorne Bed									
Latimer	Wilburton	Degnan-McConnell No. 5		4	2020	2340	2190	5.16	0.93
Pittsburg	Buck	Buck No. 22		1			2200	4.78	1.68
Pittsburg	Haileyville	Hailey No. 2		2	2090	2130	2110	8.50	1.86
Average of mines in Upper Hartshorne Bed				7	2060	2240	2170	6.15	1.51
Miscellaneous Beds									
Craig	Bluejacket	Coates		1			2160	10.61	6.34
Craig	Estella	Boot Strip Pit		1			2050	10.68	6.39
Craig	Vinita	Heldebrand Strip Pit		1			2110	10.51	6.83
Craig	Welch	Mills Strip Pit		1			2040	12.33	6.06
Haskell	Whitefield	Ligon Strip Pit		1			2000	2.62	1.44
Le Flore	Bokoshe	Slope No. 3		2	2230	2300	2270	5.12	0.78
Pushmataha	Jumbo	Jumbo		5	2200	2510	2310	6.71	1.63
Rogers	Catale	Catale No. 1		1			2160	10.25	5.40
Rogers	Claremore	McNutt		1			2230	5.10	0.89
Sequoyah	Hanson	Bremersetal Strip Pit		1			2170	5.76	1.82
Wagoner	Broken Arrow	Arkansas Valley Strip Pit		1			1960	7.25	2.75
Wagoner	Redbird	Kirk Strip Pit		1			2080	14.21	6.79
ARKANSAS									
Denning Bed									
Franklin	Denning	Denning No. 2		3	2180	2230	2200	7.38	2.45
Hartshorne Bed									
Sebastian	Hackett	Branner No. 2		2	2310	2340	2330	17.30	1.59
Sebastian	Hartford	Central No. 4		1			2090	11.27	1.15
Sebastian	Hartford	Central No. 10		1			2000	10.07	0.82
Sebastian	Huntington	Central No. 6		4	2060	2120	2090	9.60	2.01
Sebastian	Jenny Lind	Jenny Lind No. 17		1			2110	9.70	1.42
Average of mines in Hartshorne Bed				9	2190	2230	2120	11.59	1.40
Paris Bed									
Logan	Paris	Grand No. 1		3	2130	2160	2140	10.12	3.28
Shinn Basin Bed									
Pope	Russellville	Bernice		1			2180	10.36	2.23
Miscellaneous Beds									
Washington	West Fork	Country Bank (bed unnamed)		1			2150	10.30	2.00
Washington	Fayetteville	Country Bank (bed unnamed)		2	2020	2020	2020	10.73	3.41
SOUTHWESTERN REGION									
TEXAS									
Santo Tomas									
Webb	Dolores	Dolores		1			2590	19.89	2.17
Webb	Laredo	Santo Tomas		1			2570	18.52	1.78
Average of mines in Santo Tomas Bed				2			2580	19.21	1.98

and the per cent. ash and sulphur in the dry coal are tabulated for each mine tested. Average values for each mine were computed from the individual samples, and from these values averages representing each bed were obtained. It is evident that the greater the number of mines sampled the more representative are the average values for the beds. This should be kept in mind as in some instances the average values given for the beds represent only a few mines and are then not truly representative of the coal bed.

The point taken as the softening temperature is that at which the ash, when molded into solid triangular pyramids $\frac{3}{4}$ in. high and $\frac{1}{4}$ in. wide at the side of the base, and mounted in a vertical position, has fused down to a spherical lump. Points at which the tips

of the cones first fuse, and at which the ash has become very fluid, are also taken and serve mainly as an indication of the viscosity of the melting ash; however, these values are not tabulated in the table.

In general the softening temperature of coal ash from the various coal fields of the United States ranges from 1900 to 3100 deg. F. For convenience in discussion, the order of fusibility of ash may be expressed by subdividing this range of softening temperature into three groups as follows: Class 1, refractory ashes, softening above 2600 deg. F.; class 2, ashes of medium fusibility, softening between 2200 and 2600 deg. F.; class 3, easily fusible ashes, softening below 2200 deg. F.

The softening temperature of the ash from the

Interior Province coals is uniformly low. With the exception of the Santo Tomas bed in Texas and the No. 4 bed in Indiana, all the average fusibility values of the various beds are found in class 3 (1900 to 2200 deg. F.). There is no such variation among the beds as was found in the coals of West Virginia,⁵ where all three classes of fusibility are well represented. It is interesting to note that the class 3 beds of West Virginia which show low softening temperatures comparable to the Interior Province coals are those in the Monongahela, Conemaugh and Allegheny series, these coals being the uppermost coals of West Virginia and geologically the youngest. Most of the class 1 and 2 coals occur in the lower and older beds of the Pitts-ville series.

The uniformly low softening temperature of the ash from the Interior Province coal is unquestionably due to the quite general distribution of pyrite, calcite and frequently gypsum in the coal beds of this region. The percentage of iron and lime in the ash is usually quite high. In general it might be said that individual mines producing lower sulphur coal than the average sulphur values given for the bed in which they occur also gave higher fusibility of ash than that indicated by the average value for the bed.

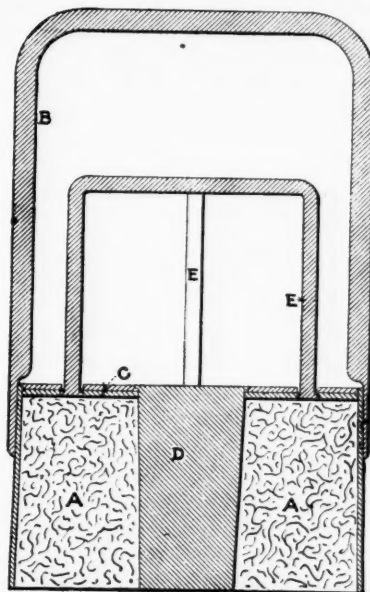
As may be expected, samples from the same mine will give ash varying in fusibility due to the difference in the composition of the ash-forming constituents included in the sample. This variation of fusibility of samples of coal from the same mine in the Interior Province is not large, averaging only 140 deg. F. in the mines represented in the table. Only in a few instances does the difference between the lowest and highest softening temperatures of a number of samples collected from the same mine exceed 300 deg. F. The majority of mines gave samples coming within the average difference of 140 deg. F. between the lowest and highest values.

Novel Coal Cake Developed and Used at the Western Front in France

Under the title of "Homemade Fuel," a process for the utilization of anthracite dust was described in the Sept. 5, 1918, issue of *Coal Age*. This was a wartime suggestion. In the Oct. 18, 1918, issue of the *Colliery Guardian* there is described a similar method developed and used in the actual theater of war on the Western front. Considerable interest attaches to this latter scheme as it has in view the utilization of anthracite and other coal dust; the coal cake (called the Ablain coal cake) is made in a simple mold by hand, the particulars of which were furnished by Col. R. Standen. This coal cake is composed of a mixture of coal dust and either clay or chalk, compressed into perforated cylindrical cakes, measuring about $3\frac{1}{2} \times 2$ in., or $2\frac{1}{2} \times 1\frac{1}{2}$ in. For some months past these cakes have been in use by a portion of the British armies in France. The material used was obtained from adjacent coal mines and was mixed in the proportion of two-thirds coal dust to one-third binder. Satisfactory results have also been obtained with four-fifths ground Welsh steam coal and one-fifth of either of the binders mentioned. Charcoal

powder has also been used, a mixture of three-fifths charcoal to two-fifths binder being employed.

The mold used in this process is illustrated in the diagram. It consists of a cast-iron shell with the rigid handle *B* and the movable ejecting plate *C*, the latter being operated by the handle *E*. The central tapered core *D* is attached to the mold and makes the perforation in the coal cake; this core also helps to compress the mixture in the mold. To prepare the mixture for



MOLD USED FOR MAKING COAL BLOCKS

the mold, the coal dust is mixed with the binder and sufficient water is added to make a stiff mass; this mixture is then spread out to the desired thickness. The mold is pressed into the prepared layer; when the mold is withdrawn the compressed cake is ejected by means of the handle *E*. This device is primarily intended for domestic users who have a surplus of coal dust which they are unable ordinarily to utilize. It is for use on a small scale and during times of scarcity of fuel, or when coal is high in price. It might offer suggestions to those living near accumulations of coal dust.

California Coal That Is Rich in Oil

For many years lignite mined near Ione, Calif., has been used as fuel, though it contains a large quantity of moisture and therefore does not burn very well. Recently, however, on account of its resemblance to some oil shales that are apparently similar to cannel coals, this lignite has been tested by the United States Geological Survey, Department of the Interior, to determine whether it would not yield oil on destructive distillation. The results of the tests show that the best of the lignite, when destructively distilled, will yield 62 gal. of oil to the ton and, as a byproduct, at least 18 lb. of ammonium sulphate, which is a valuable fertilizer. This lignite is remarkably "fat." Although it contains 46 per cent. of moisture, analysis made by the Bureau of Mines shows that it contains also 31 per cent. of volatile matter and 16 per cent. of fixed carbon. The ash amounts to only 7 per cent., and the heating value is 6060 B.t.u. Although the bed containing this lignite does not appear to underlie a large territory, it is doubtless destined to receive attention sooner or later as a possible source of oil and gasoline.

⁵Selvig, W. A.: Fusibility of Coal Ash from West Virginia coals; *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.

Lubrication of Air Compressors

BY H. V. CONRAD

Secretary, Compressed Air Society, New York

SYNOPSIS—*The oil for lubricating air-compressor cylinders should have a body of such weight as will separate the parts that have relative motion. It should carbonize but little if at all. Asphaltic base oils give a fluffy carbon, while a hard and adherent carbon is formed by those of paraffin base. Oils of high flash point are likely to produce carbon deposits. The author discusses rate of feed and carbon-cutting methods and concludes with some remarks on steam-engine lubrication.*

THE cylinders of air compressors can only be said to be satisfactorily lubricated when friction is reduced to a minimum and when the carbonization of the oil is eliminated as far as possible. If friction is to be avoided to a proper degree it will be necessary to choose an oil having sufficient body to sustain the weight of the moving parts and so form a seal between the rings of the piston and the walls of the cylinder. But the oil must not be so viscous as to absorb power needlessly.

The oil used in air cylinders apparently is always subject to a certain carbonization. It is well, however, to state just why that carbonization should be reduced to the lowest limits possible. The reasons are as follows: The deposits of carbon resulting from the carbonization of the oil accumulate on the cylinder valves, on the cylinder passages, in the pipes, and eventually in the air receiver.

In the early stages of their formation they are sticky, but they become hard and flinty later. These carbon accumulations cause sticking or incomplete closing of the valves which, in consequence, fail to act properly. This is probably the chief objection to the carbonization of the oil used in the cylinder.

The formation of excessive carbon deposits is likely to be due to any one or more of the following causes:

1. The ill-advised use of an oil, such as a steam-cylinder oil, which easily decomposes in the heat of the air cylinder.

2. The use of oils of too great a viscosity—commonly referred to as "too heavy oils." These do not atomize readily and therefore remain too long upon the hot cylinder walls, thus baking down to sticky carbon deposits.

3. The use of too much oil, which has the same effect as the use of too heavy an oil as far as the carbonization is concerned.

4. The failure to provide a proper screen over the air intake of the compressor, thus allowing free entrance of dust.

Not only does carbonization cause a sticking of valves and a choking of air passages, but it menaces the equipment with possibilities of fire. Carbon particles torn loose from such deposits may become incandescent from causes against which the manufacturers of the compressor cannot provide. If these incandescent carbon particles happen to come in contact with "oil-vapor" given off by the lubricating oil, a fire may

possibly be started the menace of which would be small or large, depending upon how much carbon had been allowed to accumulate in the compressor and in the piping leading to the receiver. If these parts are kept properly cleansed at all times there should be no danger. Oil vapor is given off from a lubricating oil at a certain temperature called its "flash point," just as steam rises from water at a certain temperature.

To a large extent the lubricant for an air cylinder should be selected with reference to the cylinder temperature it must withstand. Knowing the air pressures the temperatures in the cylinder at the end of the compressor stroke may be ascertained with fair accuracy, as shown in Table I both for single-stage and two-stage (or compound) compression, the free air being assumed to enter the cylinder at 60 deg. Fahrenheit.

TABLE I. CYLINDER TEMPERATURES AT END OF PISTON STROKE

Air Compressed to a Gage Pressure, Lb.	Final Temperature, Single Stage, F.°	Final Temperature, Two Stage, F.°
10	145
20	207
30	255
40	302
50	339	188
60	375	203
70	405	214
80	432	224
90	459	234
100	485	243
110	507	250
120	529	257
130	550	265
140	570	272
150	589	279
200	672	309
250	749	331

The temperatures given in Table I will not always occur in actual practice, for the water jackets of the cylinders and radiation from the surfaces will tend to lower the temperature at the higher pressures. At a pressure of 50 lb. and lower, the heat is quite likely to be greater than that given if the compressor is run at a high speed and is not water-jacketed.

RELATION OF FLASH-POINT TO CYLINDER TEMPERATURE

The natural inference of the reader, after noting the temperatures in Table I, is that he must select an air-cylinder oil of a flash point just above the maximum temperature commonly encountered within the air cylinder. As a matter of fact, this is not so.

The air-cylinder temperatures are useful because they aid us in selecting an oil which will resist breaking down into carbon when used in the lubrication of the cylinder. Such temperatures cannot be used as indicating the highest allowable flash point for a lubricant safe to use in the air cylinders.

In general, for average conditions, the oil should be a pure mineral oil of medium body and of the highest quality. It should not be compounded with fixed oils, such as those of animal or vegetable origin. It should, moreover, be carefully filtered in the final process of manufacture. Still a range of composition is nevertheless permissible in lubricants used for the lubrication of air compressors.

A distinction must be made between oils having a paraffin base and those having an asphalt base. Some

lubricant manufacturers claim that one class of oil is as desirable as another for the lubrication of the cylinders of compressors provided that both of them in the process of manufacture have been properly filtered so as to remove all carbon-forming elements. If, however, any carbon should be formed by the asphaltic base oils it will be of a light or fluffy nature, whereas that formed by oils having a paraffin base will be adhesive, hard and flinty.

To aid the operator in specifying what qualities should be possessed by a lubricant for average duty in air cylinders, Table II is given. I would suggest that

TABLE II. PHYSICAL TESTS OF PARAFFIN-BASE OILS

	Minimum	Average	Maximum
Gravity, Bé.....	28 to 32 deg.	25 to 30 deg.	25 to 27 deg.
Flash point, open cup.....	375 to 400 deg. F.	400 to 425 deg. F.	425 to 500 deg. F.
Fire.....	425 to 450 deg. F.	450 to 475 deg. F.	475 to 575 deg. F.
Viscosity (Saybolt) at 100 deg. F.....	120 to 180 sec.	230 to 315 sec.	to 1500 sec.
Color.....	Yellowish	Reddish	Dark red to green
Congeaing point (pour test deg. F.)	20 to 25 deg. F.	30 deg. F.	35 to 45 deg. F.

those oils which have ranges such as are described under the column marked "Minimum" should be used for light duty where low pressures and temperatures will be encountered. Any paraffin-base lubricant intended for use in "standard air compressors" should be within the ranges set forth under the column marked "Average." The following types of machines are classified as "standard air compressors":

1. Low-pressure machines compressing air to 100 lb. or less. These may be either small-sized single-stage units or larger-sized compound machines.

2. High-pressure machines which are constructed with the proper number of stages, so that no excessive temperatures are ever reached.

In other words, the lubricant which can find its appropriate place in the column marked "Average" (Table II) is always recommended unless a compressor manufacturer specifies in his literature that an oil of high flash point should be used to meet conditions peculiar to his machines. It is thus obvious that it is never necessary that a lubricant should possess a flash point as high as 500 deg. unless abnormal conditions of high temperature prevail. Oils of so high a flash point have an unusual tendency to produce the carbon deposits that we are so anxious to avoid.

The asphaltic-base lubricating oils are considered separately for the reason that the lower limit of gravity

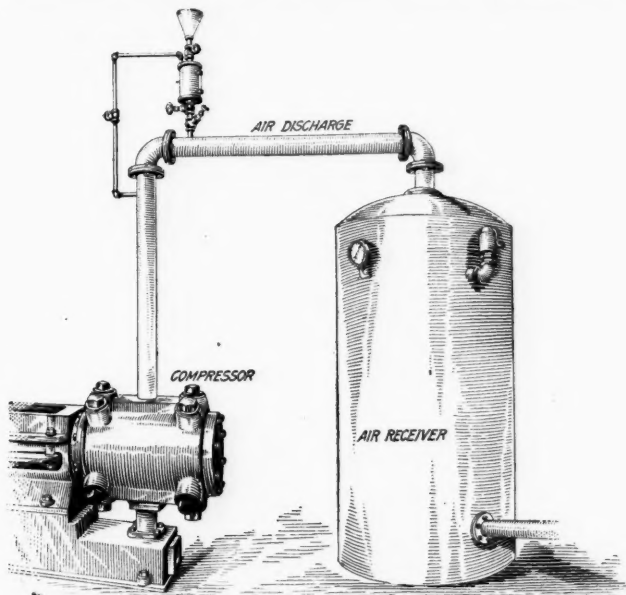
TABLE III. PHYSICAL TESTS OF ASPHALTIC-BASE OILS

	Minimum	Average	Maximum
Gravity, Bé.....	20 to 22 deg.	19.8 to 21 deg.	19.5 to 20.5 deg.
Flash point, open cup.....	305 to 325 deg. F.	315 to 335 deg. F.	330 to 375 deg. F.
Fire.....	360 to 380 deg. F.	370 to 400 deg. F.	385 to 440 deg. F.
Viscosity (Saybolt) at 100 deg. F.....	175 to 225 sec.	275 to 325 sec.	475 to 750 sec.
Color.....	Pale yellow	Pale yellow	Pale yellow
Congeaing point (pour test, deg.)	0 deg. F.	-0 deg. F.	-0 deg. F.

stated in Table II—namely, 25 deg. Bé.—eliminates this entire group from consideration, which is not the intention of this article. As a guide for the selection of suitable oil, Table III is given. In general, the recommendations of Tables II and III cover the situation as well as possible. Special cases will, of course, require investigation and special consideration before recommendations are made.

The quantity of lubricating oil to feed to the air cylinders of compressors cannot be stated in exact terms. This is because of the varying viscosity of different oils, the heat of compression and the size of the cylinder. It may be stated in general, however, that, after the cylinders have acquired smooth and polished surfaces, the quantity should be reduced to the lowest limit, to avoid the possibility of the accumulation of carbon and sooty deposits. The basis of quantity given in Table IV is recommended, subject to modifications.

It should be carefully noted that the results in the last column of Table IV are based on the assumption that, under average conditions of temperature and with the usual range of oil viscosities, a pint of oil will



ARRANGEMENT FOR FEEDING SOAP SUDS INTO AIR DISCHARGE TO CUT CARBON DEPOSITS

average about 16,000 drops. The figures are offered merely as a rough guide. Every individual must exercise his own judgment in modifying them wherever his working conditions are unusual.

A leading authority on compressor engineering contributes the following: "The best way to determine the proper amount of lubrication is to take out the valves from time to time and examine the cylinder. All parts should feel oily. If they feel dry, the lubricators should be adjusted to feed a little more oil, whereas if oil lies in the cylinder or its parts, the quantity fed by the lubricators should be reduced. By thus examining the machine a few times the proper amount of any particular lubricant under the conditions of operation can be determined. It is better to use this method of determining the number of drops needed than to adopt, without experiment, any number of drops prescribed by authority for any given oil and conditions. This is a better way to finally determine the quantity of oil required than by adopting, without this experimenting, any predetermined number of drops."

The best of lubricating oils will cause the deposit of enough carbon in the compressor system to necessitate periodical cleansing. For the removal of carbon, the machine operator should confine his efforts to the use of soapsuds. A good cleansing solution is made of 1 part soft soap to 15 parts water. About once a week the suds should, for a few hours, be fed into the cyl-

TABLE IV. QUANTITY OF AIR-CYLINDER LUBRICANT REQUIRED PER 10-HOUR DAY

Diam. of Cylinder, Inch	Size of Cylinder, Inch	Displacement per Minute, Cu. Ft.	Piston Speed, Ft. per Min.	Sq. Ft. of Cylinder Wall Swept by Piston	Drops Oil per Minute	Drops Oil per 10 Hours	Sq. Ft. Oil per Drop	Number Pints Oil Required per 10 Hours
8	8x8	120	344	718	1	600	718	0.0375
12	12x12	320	408	1230	2	1200	613	0.0750
18	18x18	880	496	2340	4	2400	585	0.1500
24	24x24	1730	550	3450	6	3600	575	0.2250
30	30x30	2940	600	4700	8	4800	590	0.3000
36	36x36	4550	644	6070	10	6000	607	0.3750
42	42x42	6700	696	7690	12	7200	633	0.4500

Figures of last column are based upon an estimated 16,000 drops per pint of oil at 75 deg. F.

inders in place of oil, either by means of a hand pump or through the regular lubricator.

The suds should be fed about ten times as rapidly as oil. The cleanliness of the air valves when inspected, as they should be periodically, will indicate whether greater or lesser applications of the soapsuds should be made. After using soapsuds, open the drain cock of the air receiver (and of the intercooler in the case of compound machines) to draw off any accumulated liquid. Before shutting down the machine, oil should be used for at least a half hour so as to prevent the rusting of the cylinder and its fittings. Never use kerosene, gasoline or lighter oils in an air cylinder for any purpose whatever, because of their volatile nature in the presence of heat.

It often happens that oil, carbon and other foreign matters are deposited in the lines through which the air is discharged and also in the air receiver. A practical method of cleaning these is shown in the illustration, where a receptacle made of 6-in. pipe is shown set on top of the discharge pipe. The diagram shows plainly the construction and what the different parts represent.

If, while the compressor is running, a mixture of 1 lb. of lye and 18 lb. of water is passed into the discharge line at the rate of 60 or 70 drops per minute, this will eat out all the carbon which has accumulated on the surface of the pipe and in the receiver; and if the blow-off valve on the receiver is open, all this foreign matter will be discharged therefrom. This cleansing solution can be used every month or two, the frequency of its application depending on the amount of carbon that may be deposited in the receiver.

Steam cylinders should be furnished with about four times as much oil as air cylinders, because the oil in the former case is constantly being washed away by the steam. Of course, conditions vary and make the ratio somewhat variable.

A pint of steam-cylinder oil will furnish from 5000 to 8000 drops, the number depending on the viscosity of the oil. Taking an average of about 6500 drops and assuming that four times as much oil is needed as for air cylinders of the same size working at the same piston speeds as given in Table III, the quantities of oil which should be fed to steam cylinders are given in

TABLE V. NEEDED OIL FOR STEAM-CYLINDER LUBRICATION

Number of Drops Needed per Minute	Size of Cylinder, in In.	Number Pints Oil Needed per 10 Hours
4	8x8	0.4
8	12x12	0.75
16	18x18	1.5
24	24x24	2.25
32	30x30	3.0
40	36x36	3.75
48	42x42	4.5

Table V. The figures are approximate only, and will vary with the steam conditions, the kind of oil used and its method of introduction into the steam; also with the boiler compound carried by the steam into the cylinder. When the operator of an air compressor succeeds in obtaining lubricating oils that are giving satisfactory results, he should be cautious about making a change to other grades, particularly if cheapening the cost is advocated by purchasing or selling agents.

But if a change is decided on, the performance of the new lubricants should be most carefully checked up before damage can occur to the rubbing surfaces of the compressors, and care should be taken to see that no increased amount of deposit collects on the inside walls of the air receiver.

The quickest way to solve the problem as to the use or rejection of any new air-cylinder lubricant safely and satisfactorily is to submit the matter to the local experts of any reputable lubricating company and to be governed by their recommendations. This advice should, however, be based on the considerations mentioned in the foregoing statement.

Use of Electric Power in the Mining of Anthracite Coal

One of the big anthracite companies, committed to an electrical policy, is systematically distributing the various power costs of operation at its plants. Much interesting information is thus obtained for comparison with former steam costs for the same duty. In this connection a paper read before the American Institute of Electrical Engineers by J. B. Crane is most timely. In this paper, Mr. Crane states a certain anthracite mine had meters installed for the different services for one year and the following average figures were obtained:

Operation	Kw.-Hr. per Gross Ton of Coal Produced
Haulage	1.73
Ventilation	1.62
Drainage	1.30
Lighting (including charging station)	0.12
Hoisting	1.02
Air compressor	2.11
Breaker	4.75
Total	12.65

The mine produced 558,394 tons of coal for the year in question and was doubtless selected as a plant presenting average conditions of cost of producing coal. If we assume 12 kw.-hr. per ton of coal produced, then there would have been required in 1917 (with a total anthracite tonnage of 89,720,982), if all the coal had been produced electrically, 1,076,652,000 kw.-hr. As a matter of fact 215,000,000 kw.-hr. were actually used in 1917 in electrically operated anthracite mines from central station and mine plants. Thus 861,652,000 kw.-hr. is the balance which would have been necessary to produce the remainder of the anthracite electrically.

In the mining and preparation of anthracite, reports have shown for years that some 10 tons of coal are required for power purposes for every 90 tons sent to market. Therefore in 1917, to produce the 89,720,982 tons of coal, 10 per cent., or 8,972,098 tons, were burned under boilers. If we can produce 1 kw.-hr. from 2½ lb. of small anthracite in large power stations, then 961,665 tons of coal would supply the 861,652,000 kw.-hr. noted in the preceding paragraph. Thus a saving of 8,010,335 tons would be effected, and this amount of coal would be released for sale.



FIG. 1. FRONT VIEW OF THE MAIN BUILDING OF THE PITTSBURGH STATION OF THE BUREAU OF MINES

The New Pittsburgh Station of the Bureau of Mines—I

BY GEORGE W. HARRIS
Editorial Staff, *Coal Age*

THREE quarters of a million employees labor in and around the coal mines of this country, the hazardous nature of their labor demanding that they be safeguarded by every reasonable precaution. This necessity was long recognized, but it took a series of terrible mine explosions with attendant harrowing circumstances to emphasize the need of positive action.

The history of coal mining in America furnishes a striking illustration of the permanent benefit that may be brought about by disaster. The great loss of life following the explosion in an anthracite mine at Avondale, Penn., on Sept. 6, 1869, aroused public sentiment in that commonwealth to such an extent that legislative action begun at that time finally gave the state a set of mining laws and a system of inspection that brought great relief to both operator and miner.

England, France, Belgium and Germany all have established bureaus in their respective countries that are attaining most satisfactory results. Especially in France and Belgium was it necessary to surround the miner with every safeguard, as here are notably deep mines and gaseous coal seams; yet the death rate among the miners of these countries was far below that of our own country, in which an average of 3½ men per 1000 employed were killed in mines in 1908.

The Bureau of Mines was organized by its first director—the late Dr. J. A. Holmes—who also planned the new building that is the present home of the Pittsburgh station. It is particularly appropriate that the field headquarters of the Bureau should be located in Pittsburgh, the center of the greatest coal and

coke and iron and steel section of the country. The new Pittsburgh station building is located in the Schenley Farms district, in the technical and educational atmosphere of the city. The property of the Carnegie Institute of Technology abuts on the south and east; the extensive building that houses the library and other benefactions of Andrew Carnegie lies to the west; on the crest of a not distant hill, a little to the north of west, is the University of Pittsburgh and the Mellon Institute.

The Pittsburgh station building is shown in perspective in Figs. 1 and 2, and the plans of the various floors are given in Figs. 3, 4, 5 and 6. The architecture is severely plain and businesslike, with an ornamental doorway at the main entrance on the north elevation (see Fig. 1). The main station building somewhat resembles the letter H, consisting of a longitudinal central building and two transverse wings, as may be seen in the illustrations. This building has only recently been taken over by the Bureau, accessory plant has not completely emerged from the construction period and the laboratory work is being reorganized and systematized; war work that has been carried on at the station is being wound up and preparations are being made to carry out the plans considered when the building was authorized.

The nature of much of the work done at the Pittsburgh station demands that the building containing the laboratories and workshops be substantial and of fireproof construction; furthermore, valuable records and results of years of research, also the samples stored

here, all dictate that there be a practical elimination of the fire risk. The building was therefore built with this in view. Imitation granite forms the side walls to the first floor, above which is reinforced concrete faced with buff brick; the floors are tile and concrete overlaid by hardwood in the offices and some of the laboratories; the partitions are of gypsum block. The main building corridors have floors of stained cement and marble mosaic. A slate roof caps the structure.

The dimensions of the Pittsburgh building suggest roominess. The central part of the station measures 59 x 240 ft., and each of the east and west wings is 46 ft. wide and 211 ft. long. The central portion and east wing were laid out for special allotment of rooms for certain work to be done; the west wing was made with rooms communicating, which permits of

and artificial gas, also electrical current. In connection with the Pittsburgh station laboratory considerable thought was given to the service problem. All main service pipes and electrical wires come into the basement of the building in a tunnel which continues under the basement corridor; from here the pipes pass through a vertical shaft up to the first and second floors. Under the first and second floor corridors are concrete passages connecting with the pipe shaft, and service mains extending the length of the building are run through these secondary passages. Special provision is made for branch pipe lines; 2 x 12-in. joists are in position under the wooden floor at right angles to the corridors, and branch pipes and wires are readily carried from main lines between these joists, up through the floor to the laboratory tables or benches. Drains from the benches and

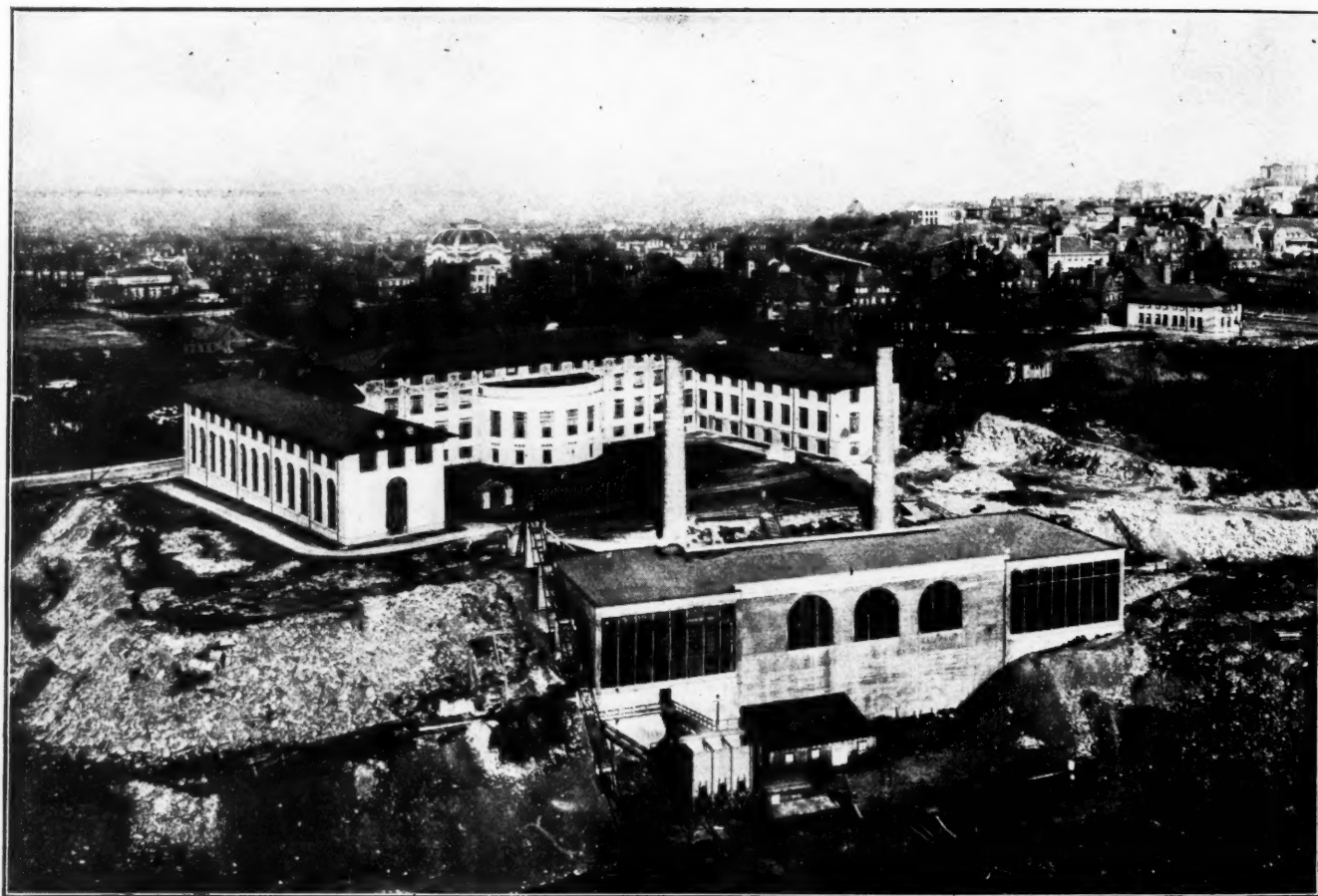


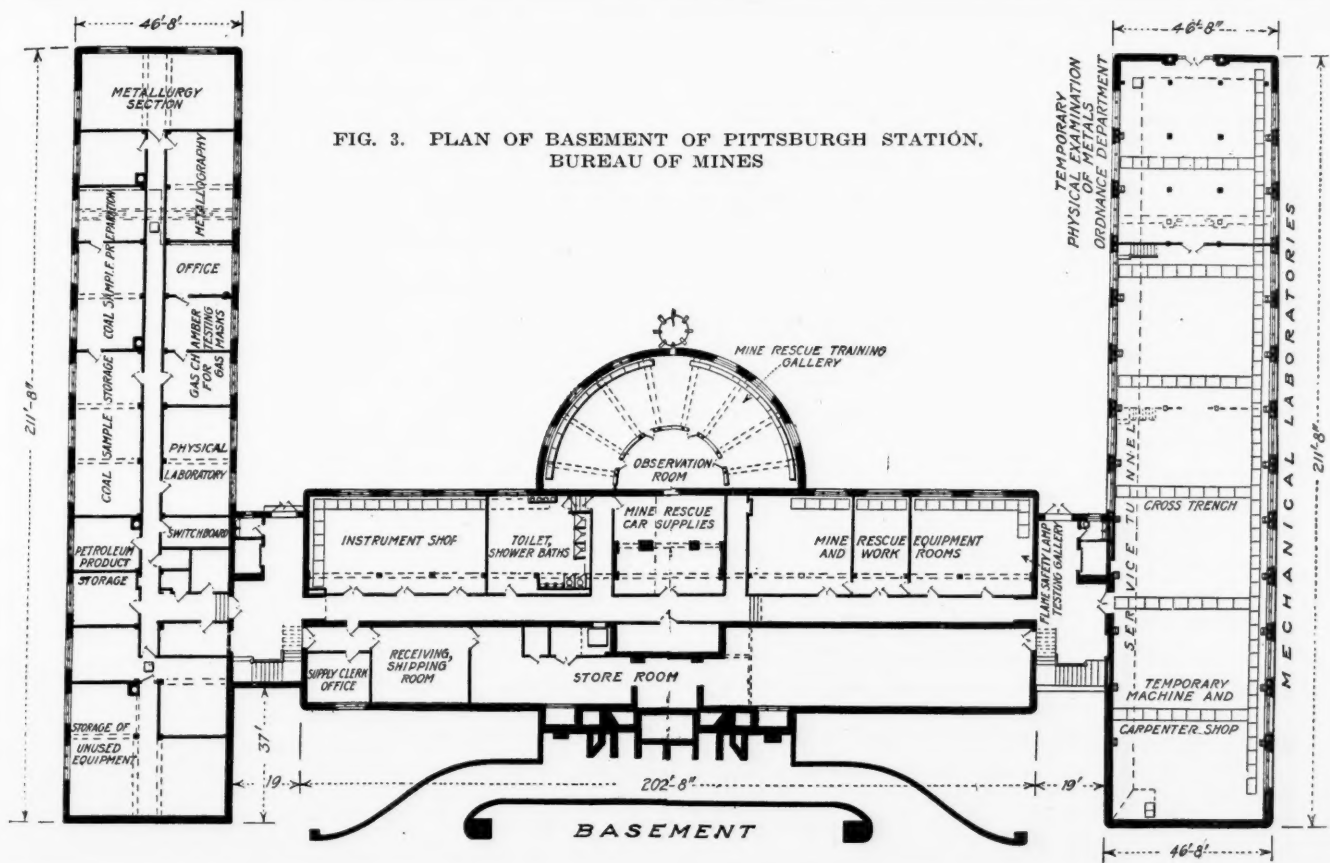
FIG. 2. GENERAL VIEW OF BUREAU OF MINES BUILDINGS, LOOKING NORTH

their being used as a suite or individually. The central portion of the building is mainly given over to administrative officials and affairs; the east wing is distinctly the chemical section and contains the various laboratories and offices; the west wing is appropriated largely by the mechanical department, the entire basement eventually constituting a mechanical laboratory that is open to the level of the second floor. Over this latter laboratory are smaller laboratories and the offices of the mechanical and electrical sections.

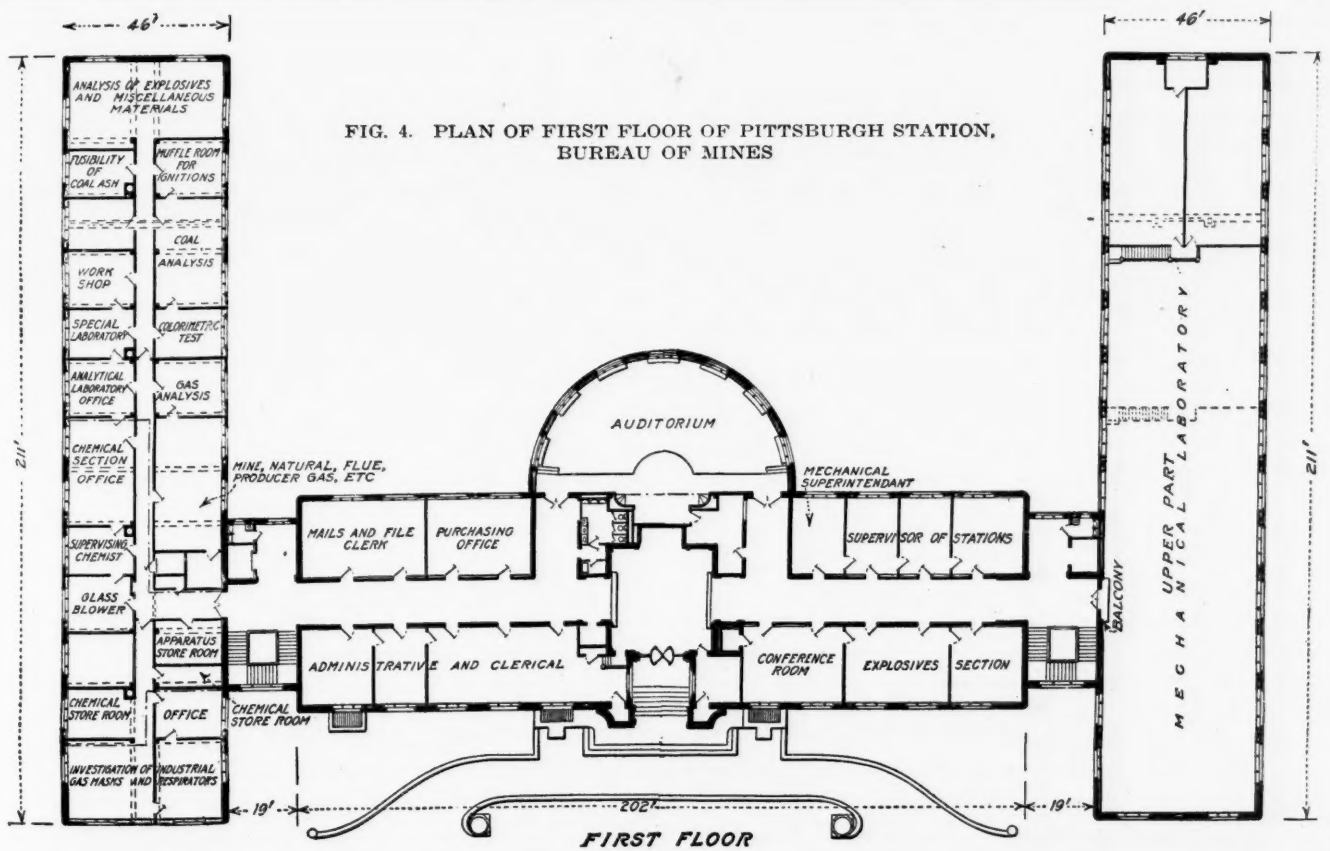
Some authority has stated that a chemical laboratory should include pipes with a building constructed around them. The significance of this comment is evident to the initiated and should be plain to anyone when it is known that a modern laboratory service often includes hot and cold water, compressed air, vacuum and natural

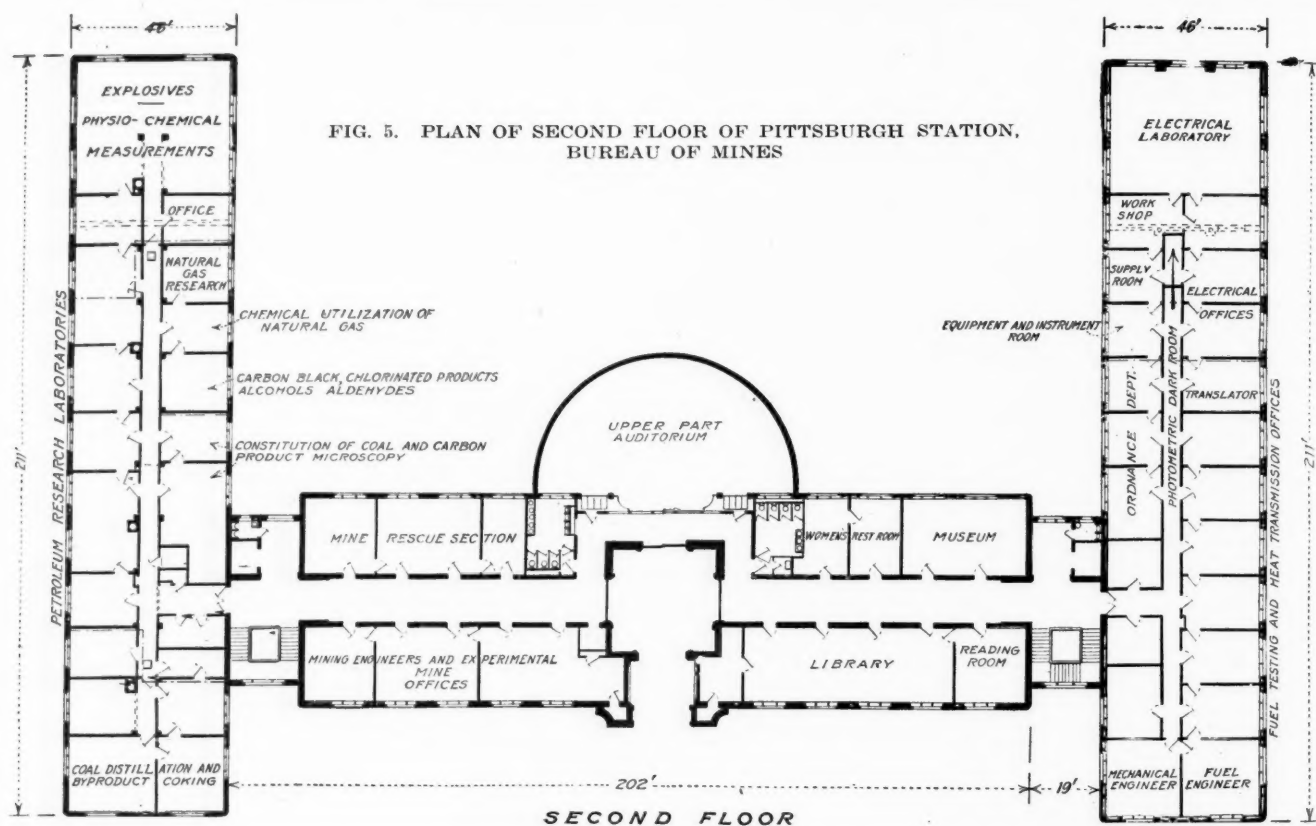
sinks are carried to vertical risers of acid-resisting fiber pipe leading down to a terra cotta drain in the basement tunnel.

The efficient and thorough ventilation of a laboratory, especially the hoods, is most important. This feature of the station chemical laboratory has been most satisfactorily worked out and was put to a severe test recently. In the war-work investigations of gas masks and respirators, some powerful poison gases were used; and their complete and direct removal from that part of the building where they were used was most imperative. The ventilating system of the laboratories of the entire wing includes four vertical flues equally distributed along the length of the building and connecting with all hoods by galvanized-iron air ducts painted inside with an acid-proof preparation. These vertical flues

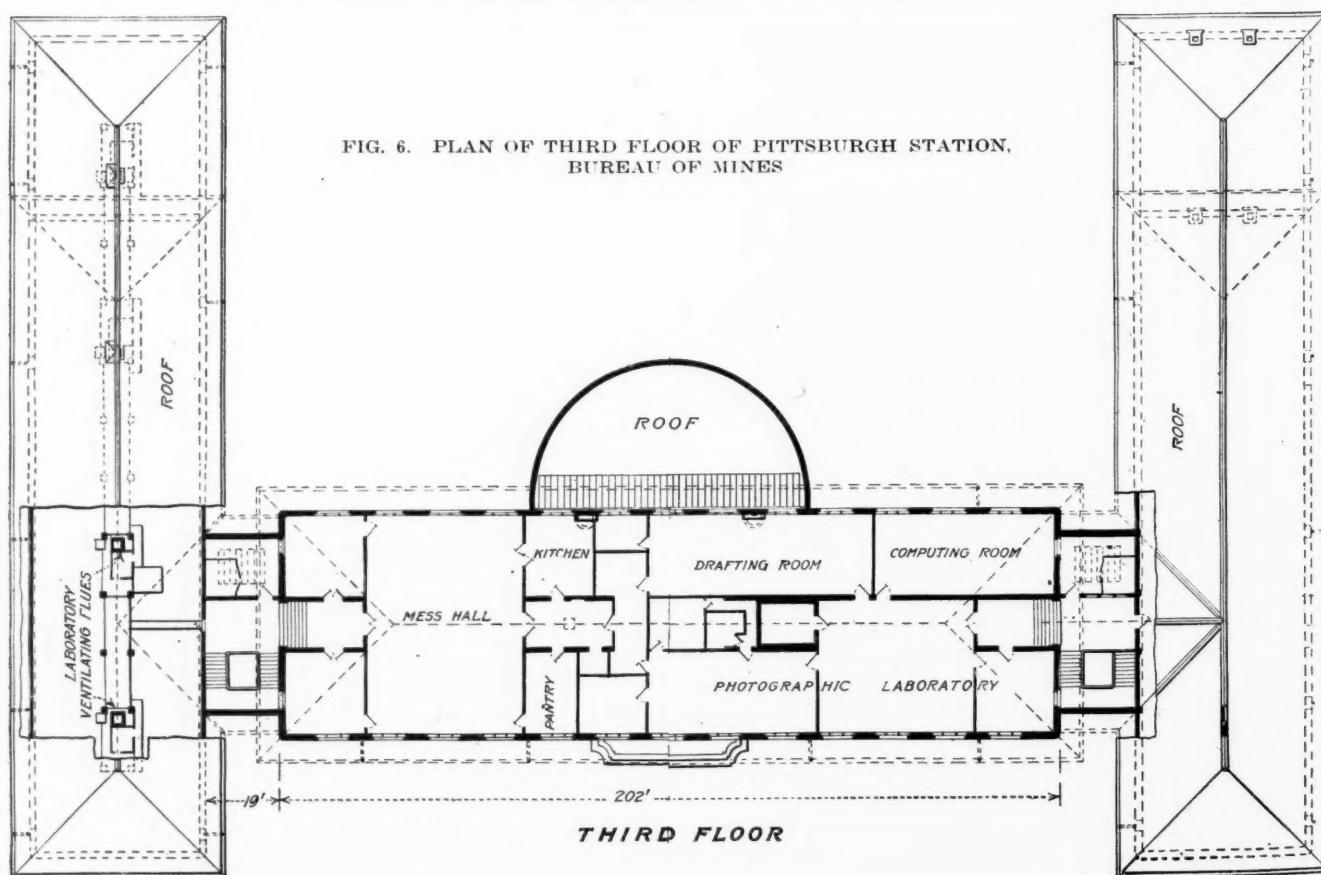


Basement of New Pittsburgh Station Is Largely Given Over to Storage Space, While First Floor Houses the Administrative Offices and an Up-to-date Auditorium





On Second Floor of New Pittsburgh Station Are Located the Petroleum and Electrical Laboratories, the Third Floor Containing the Drafting and Computing Rooms



extend to the loft over the chemical wing; here fans exhaust the fumes from the laboratory and force them out of the building through four vents in the roof.

The basement of the chemical (or east) wing is largely given up to storage of unused equipment, petroleum products and coal samples. A great number of coal samples have been taken from seams in mines throughout the country, and all these have been carefully preserved, making a valuable collection. In time they cannot be used for B.t.u. determinations, but for some purposes such as ash-fusing tests they answer the same purpose as freshly gathered samples. Coal samples are prepared in the basement, and gas masks are tested in a special gas chamber fitted up for the purpose. The disposition of other space is indicated on the plans.

On the first floor of the center building are the offices of the administrative and clerical forces. In the bay is an auditorium capable of seating 228 persons; it is at the service of the mining and scientific public at any time, upon application. The stage is equipped for lantern slide, moving picture and demonstration work of various kinds. The conference room on this floor is also available for small gatherings of scientific or technical men. The appointments of the room are in keeping with the purposes for which it was designed. The accompanying floor plans clearly note the uses to which the space on the second and third floors is put.

The mechanical laboratory takes up the whole floor space in the basement of the west wing. It is one large open room and of a height equal to the basement and first floor rooms in the center building and east wing. This laboratory is equipped for all kinds of mechanical work or testing. The floor is cement. On one side of the room provision will be made for a run of over 200 ft. in length on which rope tests and experiments can be made. On the other side of this laboratory is a service tunnel just below the floor level; connecting with the tunnel and at right angles to it are six cross trenches; the latter are 2 ft. deep and 3 ft. wide. The tunnel and trenches carry the service pipes and wires, which thus are distributed convenient for use at any part of the laboratory. At present the north end of the mechanical laboratory is used as a temporary machine and carpenter shop; the south end is now occupied by the ordnance department, which is conducting physical examinations of metals. The plan of the second floor of the west wing is self-explanatory as to disposition of space.

An important feature of the Pittsburgh station is the power plant that occupies the low building in the immediate foreground (see Fig. 2). The steam-generating end of this plant is a temporary arrangement. Two Babcock & Wilcox boilers are set independently with Sewell-type baffling; they are fired with Playford, type B, chain-grate, mechanical stokers that are 6 ft. wide and 10 ft. long. Another boiler—a 208-hp. Parker—is being erected, and this unit will be fired with an Illinois, chain-grate, mechanical stoker, 5 ft. wide and 10 ft. long. Pittsburgh seam screenings are fired under the boilers.

A feed-water heating system is used, the temperature of the city water being raised to about 210 deg. F. and then pumped into the boilers. The water is slightly hard and a Permutit water purifier system has been installed. Eventually the steam-generating plant will

be in an addition to this building, on the ground level. This new arrangement will permit of satisfactory mechanical handling of coal and ashes. At present this work is done partly by hand; the coal is shoveled by hand from a railroad car into a skip that runs up the inclined track (see Fig. 2) and dumps it into a bin. Further handwork is necessary in the boiler room to fill the stoker hoppers at the grates. This expensive work will be done away with in time.

Electric current is generated in the center room of the power plant, first floor, by three 18 x 24-in. single Nordberg engines direct-connected to three-phase, 60-cycle, 440-volt, 200-k.v.a., revolving-field, General Electric alternators.

For ordinary service in the laboratories, 110- or 220-volt direct current is furnished by a 50-kw. Crocker-Wheeler motor-generator set—a synchronous motor in control and a 110- and a 220-volt direct-current generator being mounted on either side; all this apparatus is mounted on a common base. For direct-current circuit-breaker and switch tests, a direct current of 220 volts is supplied by a De Laval turbo-generator set; the turbine driving two 220-volt, 110-kw., direct-current generators.

In the east end of the power building is the fuels laboratory. Tests will be made here soon on house-heating boilers, to determine the heating value of coal in terms of wood. This problem is of practical interest outside of army circles. Under the first floor of the power building are pipe and wire galleries and also rooms for apparatus accessory to the machinery and steam plant above, such as a pressure oil-circulating system and so on. The main building of the Pittsburgh station is heated by exhaust steam from the engines in the power building; and the steam mains go from one building to the other through a tunnel.

The building shown in Figs. 1 and 2 is the first of a group; others are contemplated, and construction is at present proceeding during suitable weather on additions to the plant. A gallery for testing large explosion-proof apparatus is being completed near the end of the chemical wing of the station; the structural steel frame of the gallery building is shown in Fig. 2. Adjacent to the gallery is to be a garage—the materials for the building are on the ground. The garage will house automobiles, mine rescue trucks and passenger cars for jitney service between Pittsburgh and the Bruceton experiment stations; this building will include a tire and repair shop. Plans are being completed for an explosives magazine designed to hold quantities of explosives temporarily stored here awaiting chemical analysis and tests.

By referring to Fig. 2 it is evident that the Bureau of Mines building faces one of the fine residential sections of Pittsburgh. When the idea was suggested that this building be erected in the Schenley Farms district of the city, considerable opposition developed on the part of those owning homes here. To the average Pittsburgher the thought of a mines building going up in their midst would be somewhat alarming. However, little difficulty was finally experienced in acquiring a fine site for the station, which bids fair to considerably enhance the prestige of the educational and technical reputation of the Iron City.

(To be continued)

Governor Sproul Withdraws His Criticisms of the Anthracite Industry

On Mar. 13 Governor Sproul of Pennsylvania, much perturbed at the increased cost of anthracite, asked the Attorney-General to tell him what powers he had to inquire into the cost of anthracite. On Aug. 4 the governor, having assured himself that the price increase was justified, much to the credit of his reputation as an honest and fearless public servant, made the statement given below.

SINCE the announcement of the proposed raise in the price of domestic sizes of anthracite coal at the mines, last month, I have given a great deal of time to the making of a businesslike personal investigation of the anthracite situation. In this I have received every coöperation from the operators and from others interested in the question. I have made the investigation personally as a business man and as a state official rather than by utilizing the more ponderous implement of a legislative committee, because I was convinced that it was essential, in view of the commercial interests involved, that decision should be given promptly.

HAD ACCESS TO ENGINEERS' REPORTS

In my inquiry I have had access to the reports made by the engineers and experts employed by the United States Fuel Administration. These reports are very complete and their determinations are recent and up to date. I have also had the sworn figures of the producing corporations, both the railroad operators and the independents, before me and have had the benefit of the advice and experience of some of those who assisted the Federal Fuel Administrator in his determinations.

H. A. Garfield, the United States Fuel Administrator, when he relinquished active control over coal prices on Feb. 1 of this year, made a statement in which he said among other things:

"Had the Fuel Administration's active control over maximum prices on anthracite coal been continued the cost examination above referred to shows that it would have been necessary, on the basis of the present wage scale, to raise these maximum prices possibly as much as 50c. per ton above those last fixed by the Government, in order to prevent financial embarrassment and perhaps the closing of companies producing a substantial percentage of the necessary anthracite output. Such a curtailment of production would eventually result in the demand exceeding the supply to such an extent as to increase the prices much higher than they would be if that supply was continued."

I am convinced that Dr. Garfield's judgment in this matter was correct and that the action of the producers in announcing a gradual increase of 10c. a ton for five months, beginning May 1, is justified, considering all of the conditions confronting the trade. We are all anxious that the present wage in the anthracite regions be maintained, as this industry in one way or another affords employment and sustenance to almost one-

tenth of our industrial population in Pennsylvania. It is also a fact to be thoroughly considered that only about one-eighth of the anthracite coal mined in Pennsylvania is consumed in this state, the balance going outside of the limits of the state. The Federal Fuel Administration's experts showed that the cost of mining and preparing anthracite coal has increased 52 per cent., while the price at the mines has increased only 30.5 per cent.

WILLING TO COÖPERATE

Several of the larger independent operators and some of the so-called railroad interests were willing to defer the beginning of the increase until July 1, instead of May 1, had I so requested. I feared to insist upon this, however, as it would have meant a derangement in the trade throughout the entire anthracite-using section and would undoubtedly have worked hardship upon operators and the throwing of many people out of work by preventing early buying of anthracite and its storage in cellars for next winter's use.

There has been a marked falling off in the production of coal during February and March, many mines being on short time and others closed. It would be dangerous, therefore, to delay the settlement of the question longer for the usual mining operations during the spring and summer would be reduced and a shortage in coal and consequently higher prices would result next winter. My feeling is that everyone who can do so should lay in coal now.

There are other elements entering into the cost of anthracite coal at the homes of our people which need some sort of regulation and control. There are great inequalities in the railroad rates as planned by the Federal Railroad Administration, and, of course, a considerable part of the increase in the price of coal has been due to these increased rates for carrying domestic coal to the user. For instance, the freight rate to Reading is \$1.90, although the haul from the Schuylkill region is but little over fifty miles, while the same rate prevails to Philadelphia, nearly sixty miles further. If our railroad situation is ever unscrambled and the state ever again has authority over its interstate business an investigation must be made to iron out these inequalities and give the people their rights in the matter.

DISTRIBUTION CHARGE HIGH

The charges for distribution, which were fixed at a very high figure during the extraordinarily severe winter of 1917-1918, when heavy snows and the worst weather in a generation made the handling of coal extremely difficult, still remain in force in most places, although in some cities of the state reductions of as much as 50c. per ton have been made in the delivery charges. The dealers have their troubles, too, in increased expenses for labor and materials, but it would seem that there is generally room for reductions in the distribution charges which will at least make up and perhaps exceed the increase which is necessary at the mines.

It would seem that there should be some continuing authority over the fuel situation to prevent runaway

markets, extortion and to maintain the trade on an equitable basis, fair to labor, producer, dealer and consumer.

It would also seem that our larger communities might very well be given the right to establish coal markets for supplying their own citizens. Well conducted public fuel markets would likely be able to save the citizens of our larger communities as much as a dollar a ton upon domestic fuel coal.

[It may be said for the retail dealers that their prices were probably kept up in anticipation of a heavy snowfall which would make such prices as they were charging wholly inadequate during the long period in which the snow might be expected to encumber the streets. No one knew till spring was well on its way that the weather would be mild.—EDITOR.]

Instrument for Locating Entombed Miners

The geophone, a listening instrument invented by the French during the war to detect enemy sapping and underground mining operations, and for the location of enemy artillery, is now being used by the Bureau of Mines as a possible aid in locating miners who have been entombed after a disaster. This instrument was further developed by United States engineers and is now used by the bureau according to plans drawn by these engineers. Alan Leighton, of the bureau, has charge of investigations being conducted with the geophone by the department with which he is connected.

The instrument, though small, is essentially a seismograph, since it works on the same principle as the ponderous apparatus with which earthquake tremors are recorded. It consists of an iron ring about 3½ in. in diameter; within the center of this ring is suspended a lead disk which is fastened by a single bolt through two mica disks, one forming the top and the other the bottom cover of the ring. Outside of each mica disk is a brass cap piece fastened with bolts to the iron ring and serving also to hold the mica disks in place. The top brass cap has an opening in its center to which is fixed a rubber tube leading to a stethoscopic earpiece.

The geophone is simply an air-tight box in which is suspended a lead weight between two mica disks. In operation, if the instrument is placed on the ground and anyone pounds or digs in the vicinity, then energy is transmitted as wave motion to the earth and these earth waves shake the geophone case. The lead weight, on account of its mass and because of its being suspended between the mica disks, remains comparatively motionless. Thus relative motion is produced between the instrument case and the lead weight, with resulting compression and rarefaction of the air in the instrument. This rarefaction and compression is carried to the ear drum by the rubber tube and stethoscopic ear piece. It is customary to use two instruments, one for each ear.

When the two instruments are used, it has been found that the sound is apparently louder from the instrument nearer the source of the sound. It is evident then that by moving the instruments around, a point can be found where the sound will be of the same apparent intensity in both ears. The direction of the sound is then on a perpendicular to the line connecting the centers of the two instruments either in front of or behind the observer. Further observation will show which side. Direction of sound is quite accurately determined in this way. The sound is not actually louder

in one ear than in the other, but the ear is capable of distinguishing the difference in time at which the sound arrives in the two instruments.

The Bureau of Mines engineers have done considerable experimenting with the geophone, determining the distance that different mining machines could be heard through clay, shale, coal and strata overlying coal beds. Measurements were also made of the energy required to be given to various tools that blows might be heard through definite distances of rock and coal. The shock waves resulting from the discharge of explosives were also investigated. To give some idea of the sensitivity of the instrument, it may be said that pounding with a pick on bituminous coal has been detected at a distance of 900 ft. and the direction determined; pounding with a sledge has been heard as far as 1150 ft. These measurements were made in the Pittsburgh coal seam, which is somewhat harder than most other bituminous coal beds. One interesting feature of the instrument is that the sound as transmitted to the ear is characteristic of the instrument producing the sound.

It is thought that the geophone possibly will be of great value to mine rescue crews who may enter mines for exploration, and to locate miners who may have been entombed after a disaster. The distance at which sounds can be heard depends greatly on the character of the coal upon which a man is pounding; intervening rooms and entries seem to have surprisingly little effect in interrupting sound or in confusing the determination of direction. On the other hand, any wind blowing outside the mine greatly interferes with the successful operation of the instrument on the surface. Furthermore, dust tends to dampen the transmission of sound; and since mine tracks often either rest on such material or are surfaced with it, sounds are not usually transmitted well by rails. The same is true of pipe lines which are buried in mine dust; however, when pipes are supported on ties or fastened to props, pounding on them can be heard great distances. Miners are well aware of this and frequently signal to the surface by hammering on pipe lines up shafts and slopes.

After the bureau has completed its investigations, a course of instruction in the use of the geophone will be developed and recommendations will be made as to the best procedure for rescuers to follow when using the instrument, and also what entombed miners should do to assist toward their rescue.

Wasted Fuel in Factories

In most factories the ashes and waste from boiler and other furnaces carrying a variable amount of usable fuel is either taken to a common dump or is carted away without any attempt at recovery of the useful portion, even sifting not often being done. In this way a loss of fuel occurs, and it would seem that decided improvement could be effected in the treatment of both factory and domestic fuel wastes.

Probably a combination of dry and wet separation would give the best results, the material being graded and to some extent separated dry by means of screws, as in a coal washery, and afterward separated in wet jigging or other machines so far as the heavy waste is concerned. Metals and other material passing over, say a 2-in. mesh screen might well be hand sorted. Fine stuff below that passing a ¼-in. mesh screen could be left untreated. The result of treating the grades between ¼-in. and 2-in. would be fuel and waste.

News From the Capitol

By Paul Wooton



Railroad Fuel Policy Still Subject of Much Acrimonious Debate

Little progress has been made during the past week in the controversy over the purchasing policy of the Railroad Administration. The matter has been the subject of bitter discussions. Officialdom is divided, and there is a diversity of opinion among coal operators and steel makers. Director General Hines apparently is of the opinion that the low-cost mines can produce all of the coal that is needed at this time and is opposed to adjusting prices so as to permit other properties to operate. His view apparently is that the low-cost operations will absorb such labor as may be released from higher-cost properties, to say nothing of the increased employment which would be made possible if coal and steel costs were reduced.

The National Coal Association has not replied to Director General Hines' last statement alleging selfish motives on the part of the coal operators. It is the intention not to dignify it with a reply.

Investigation Bureau of Fuel Administration Will Cease Work on May 1

The Bureau of Investigation of the Fuel Administration will close out its work May 1. Any cases which may be pending on that date will be turned over to the legal division. When the Bureau began its work, there were 1800 jobbers of coal in the country. This number increased to 4800, largely as the result of the licensing system and the 15c. a ton addition to the price.

Of that large number in the jobbing business, all but eighty have reported according to the regulations. An analysis of those eighty, however, shows that there were no intentional violations of the regulations. Most of the number is made up of those who expected to do a jobbing business but through failure to obtain coal did not actually handle any tonnage.

More than 30 per cent. of the workmen in coal mines, it is believed, are non-resident aliens. This means that a large amount of work will fall to coal operators under the new revenue law, in which they are charged with the duties of withholding income tax at the source.

The Government, on Apr. 9, filed its brief in the Supreme Court of the United States in the case of the United States vs. the Lehigh Coal and Navigation Co. The case, which has been in the courts since 1915, revolves around an alleged payment of rebates by the Central Railroad Co. of New Jersey to the coal company.

Some Interesting Comparisons in Prices of Basic Commodities

How far the cost of living, for individuals and industries, has gone down or is likely to go down is again brought to the fore by the announcement of a price readjustment for the steel industry. The new schedule of steel prices is interesting, not only for its actual figures, but for the results obtained from a comparison with prices ruling in January, 1914, before a world war became the main price factor.

Such a comparison indicates that even under the new schedule steel prices show a tremendous increase, surpassing the advance in America's other great basic commodity, coal, whether anthracite or bituminous.

Here are figures for iron and steel, showing the percentage of increase in the present revised prices over those prevailing in January, 1914, the latter being taken from *The Iron Age*:

Commodity	January, 1914	March, 1919	Increase, per Cent.
Basic iron, gross ton	\$12.50	\$25.75	106.00
*Black sheets, No. 28	1.87	4.35	132.62
Galvanized sheets, No. 28	2.87	5.70	91.63
Steel bars	1.20	2.35	90.58
Tin plate, base box	3.32	7.00	110.84
*Tank plates	1.20	2.65	120.83
*Nails	1.54	3.25	111.03
Wire rods, gross ton	25.50	52.00	103.92
Billets, 4-in	20.13	38.50	91.26

Two additional comparisons are here given, the 1914 figures being from records of steel concerns in Philadelphia:

*Shapes	1.20	2.45	104.16
*Light rails, gross ton	22.00	54.88	158.54

* Products so marked enter largely into anthracite mining.

As against this, anthracite, all sizes, averaged much less, comparing January, 1914, against March, 1919. The three standard domestic sizes—egg, stove and nut—illustrate this. White ash egg coal cost \$3.75 at the mine in January, 1914, and \$5.85 in March, 1919, an advance of 56 per cent.; white ash stove, then \$4 at the mine, is now \$6.10, an advance of 52.50 per cent.; white ash nut, the most popular size of all, which then cost \$4.15 at the mine, is now \$6.20, a gain of but 49.39 per cent. in a five-year war period.

The percentage of increase, taking all hard coal, including steam sizes, would be much less than the figures shown above. The United States Government, through the Bureau of Labor Statistics, Department of Labor, in the March issue of the *Monthly Labor Review*, gives the advance in all Pennsylvania white ash coal since 1913 as 44 per cent.

Bituminous coal, on the average, has likewise advanced but 44 per cent. over 1913 figures, though of course certain grades advanced beyond that percentage; but coke was not so moderate. Connellsville furnace coke, sold for \$1.85 in January, 1914, while it was

quoted at \$4 for the week beginning Mar. 24, 1919, a gain of 116.2 per cent.

Not only has coal been beaten out by steel, even using the present steel prices and ignoring the still higher quotations during the last two years or more, but food keeps mounting. Bradstreet's index number, based on the wholesale prices of 31 foodstuffs, was \$4.74 for the week ended Mar. 27, 1919, a gain of 9.7 per cent. over the corresponding week last year, and comparing with \$4.62 Feb. 27, 1919.

Below are comparisons of food and cotton prices, just before the world war began and as of Mar. 27, 1919. The former figures are from Government reports, and the latter from Bradstreet's:

Commodity	July, 1914	Mar. 27, 1919	Increase, per Cent.
Steers, live.....	\$9.219	\$18.70	102.8
Hogs, live.....	8.769	19.38	121.0
Flour, standard pat.....	4.394	11.95	160.1
Butter, extra creamery.....	.27	.5925	119.4
Granulated sugar.....	.042	.0905	115.4
Cotton, mid. upland.....	.131	.2830	116.0

Will Put Price Stabilization Program Up to President Wilson

Overshadowing all other matters in official interest during the past week has been the controversy between the Railroad Administration and the Industrial Board of the Department of Commerce over the matter of price stabilization. The discussions have been followed closely by all industries, as the concentration of buying power in the unified administration of all railroads has brought many industries face to face with a most serious situation.

While the whole controversy has been waged around steel rails, it was really the coal operators who brought the question to a head. They declined to enter into any agreement with the Industrial Board until absolute assurance could be given that the Railroad Administration would be a party to the agreement. A number of statements have been issued in the matter, but the one by George N. Peek, the chairman of the Industrial Board, is regarded here as being of unusual interest since it clearly outlines the issues in which so many industries are vitally interested. Mr. Peek's statement, slightly abridged, is as follows:

The Industrial Board was formed to carry out a perfectly defined industrial policy to which the Government, represented by the President, the cabinet and the director general, was fully committed. There is no ambiguity either in the record or in the minds of the people of the United States as to just what that policy is—it is to avoid industrial stagnation pending a return from war to peace prices, to start the wheels of industry, to give employment to labor, to reduce the cost of living, to insure prosperity. Neither is there any ambiguity as to the methods to be employed in accomplishing this end. A scientific study of costs of production is to be made. Upon these studies of costs, prices of basic commodities are to be determined which shall be as low as cost of production will permit, which shall squeeze out all speculative or opportunist profit and upon which industry can commence operations without fear of any considerable drop in the market. This policy and this method are viewed by our people as the first constructive, comprehensive and direct attempt to reduce the cost of living.

To the complete success of this plan, however, there was one absolute essential, that the governmental departments should express the confidence of the Government in the execution of this most important policy. Especially is this true in respect of steel rails, in the buying of which the Government, through its control of the railroads, consumes a very large percentage of the output.

Considering the first of the Director General's reasons

for refusing to accept the steel prices—that the Industrial Board has no right to impose a price on the Railroad Administration—the technical prerogative of the Railroad Administration must be and always has been cheerfully conceded by the Industrial Board. But presuming the Government to have been committed to this important industrial policy the board feels that the Railroad Administration is under a powerful, if not a compelling, obligation, either to have the governmental policy abandoned by the same source that announced it and to assume full responsibility for the inevitable effect of such a step, or to support the policy, or to demonstrate that the Industrial Board has failed in its function and that the prices announced by the board are not fair.

This brings us to the second of the Director General's reasons for his grave action—that "in his opinion" the prices are "too high." The significance of this expression cannot be overlooked.

A representative of the Railroad Administration is a member and a part of the board. Contrary to Mr. Hines' impression, this representative did not maintain that the prices of steel generally were "too high." He finally dissented only on the price of rails. That is not, however, the circumstances of greatest significance, which is that, throughout the discussion, from its earliest word to this latest pronouncement, the figures representing the costs of production were constantly available to the Railroad Administration's representative, and the basis upon which conclusions have been reached has been repeatedly represented to the advisors of the Director General and to Mr. Hines himself. Never have those figures been contested, never have additional or contradictory data been presented, never has the argument of the Railroad Administration been addressed to those figures nor to the conclusions drawn from them by the board.

In fairness to the Railroad Administration it must be admitted that, by using the full effect of its power of monopolistic buying it might secure a price on rails somewhat lower than that announced by the Industrial Board. The figures stand to prove, however, beyond all question, that such a price would be lower than production costs of any but one or two of the most highly organized, powerful, and lowest cost producers. For example, the pre-war price of rails was \$30. The increase over pre-war costs of production, for the United States Steel Corporation, in direct labor alone, excluding labor in transportation, is reported by that corporation to be \$19.48 per ton. The price approved by the Industrial Board on rails was \$47, or \$2.48 less than the increase of cost of labor alone would account for.

The inevitable result of the use of the enormous buying power of the Railroad Administration to reduce any price would be to create a situation which would have to met in one of the following ways: (a) Increasing of the prices to the public, (b) throwing all railroad business into a monopoly of powerful producers, (c) reducing wages.

In the opinion of the majority of disinterested men all of these results are highly undesirable and are, of themselves, gravely inimical to industry and to the public welfare. These results alone are, however, of an importance relatively incomparable to the vastly greater harm in the frustration of the industrial policy of the Government and the forced return to the period of commercial and industrial stagnation.

Doubtless the Director General is within his rights in insisting upon his technical prerogative to determine prices for himself, to exercise an arbitrary discretion in making that determination, and to use all the powerful means within his control to obtain the lowest possible prices on iron, steel and coal for railroad consumption. The board insists, however, that in the exercise of that right the Director General must assume full responsibility for all the results of the course he has chosen.

It is not the opinion of the board that governmental organization is such that important policies can be so lightly frustrated. The Railroad Administration's refusal to accept the steel prices puts a temporary check on the work of the board, but before abandoning the vital industrial policy which it represents, the board will see that the whole controversy is submitted to the President for final decision.

NEW APPARATUS AND EQUIPMENT

Portable Scoop Conveyor Does More Work with Less Manpower

The new type of portable belt conveyor manufactured by the Portable Machinery Co., Inc., of Passaic, N. J., is an improvement over previous designs. The machine is operated either by electric motor or gasoline engine and is known as a scoop conveyor, because the conveying belt receives its material from a scoop that can be forced under or completely buried in the material to



EFFICIENT CONVEYOR FOR HANDLING LOOSE MATERIALS

be conveyed. It will handle coal at the rate of 1 to 1½ tons per minute, depending upon its size.

The object sought is to provide a portable machine than can readily and easily be handled by one man for the purpose of loading and unloading, stacking and reclaiming loose materials such as coal, coke, ashes, crushed stone, sand and gravel.

This conveyor has a wide range of application. In the accompanying illustration it is shown handling coal from a pocket to a wagon at a big saving in labor. It will also handle sacks, packages, boxes and various manufactured products. One man with this conveyor, it is claimed, will handle without difficulty loose materials with greater speed than 6 to 12 men without it.

It is highly important under present-day operating conditions to keep trucks moving, save demurrage charges and cut the cost of shoveling. A number of well-known coal concerns are already employing from one to six of these conveyors.

Motor-Driven Shovels and Dragline Equipment for Mine Work

As a means to economy where electric power is available, electrically driven shovels or draglines are used for stripping overburden, mining coal, excavating, dredging, reloading coal and coke, and similar work.

The advantages arising from the use of the electrically driven shovel and dragline are as follows: Lower operating cost, especially when fuels are scarce, expensive or hard to transport; a smaller number of operatives are required; there is no water to supply line to freeze; no boiler or boiler troubles; no standby

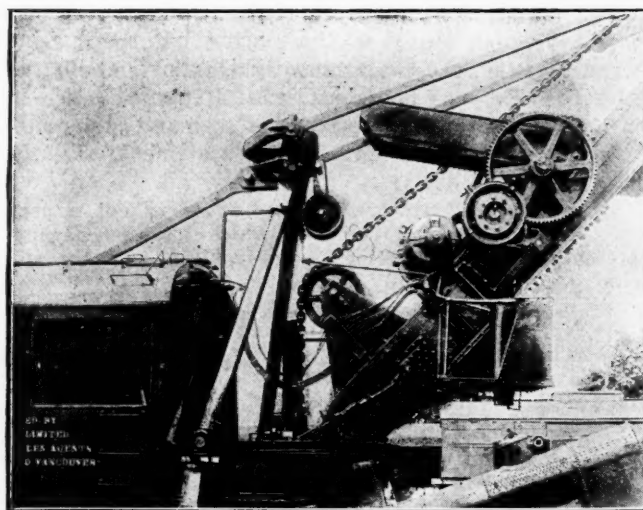
losses; no smoke; no sparks; no objectionable noises; and more material can be handled.

A complete line of shovel and dragline equipment that meets the especially severe service encountered in such work has been designed by the Westinghouse Electric and Manufacturing Co. Simplicity is one feature of the apparatus tending to give it reliability in operation without skilled and frequent attention.

Both alternating- and direct-current equipments can be furnished. In general, the location of the shovels make alternating-current equipment preferable, because this current can be transformed economically. With the use of alternating-current motors the necessity of converting alternating to direct current is eliminated.

Such motors are of the wound-rotor type capable of exerting powerful effort at the instant needed in the cycle of operation. Each motor is mounted on a heavy frame with a strong shaft and amply large well-supported bearings of the oil-ring type. The rotating part is of small diameter and consequently has a low flywheel effect, which permits rapid starts, stops and reversals. The motors have few wearing parts and require little attention except for an occasional oiling.

The controllers are simple and compact, and are so designed and arranged that the operator can, by manipulating his master switches, cause the shovel to respond to his every wish with facility. By means of

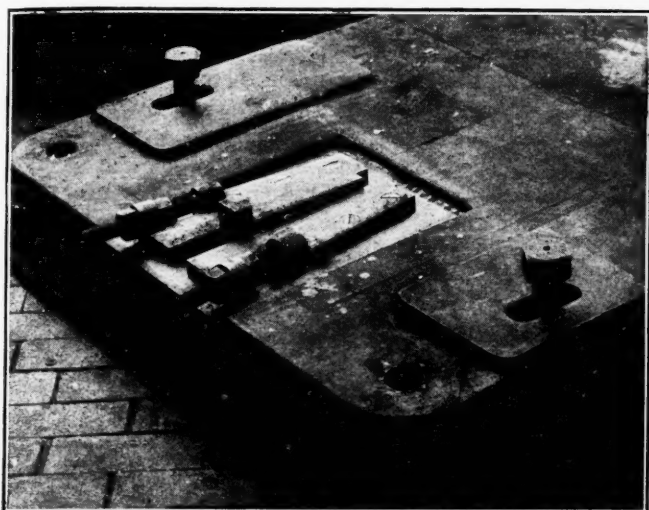


ELECTRICALLY OPERATED SHOVEL REDUCES LABOR COSTS

the protective features of the controllers the shovel or dragline can be operated at its maximum rate without injury to attendants or equipment, and without loss of time. Due to the ease and simplicity of control and the savings in power cost, through the use of the motor-driven shovel and dragline equipment, not only can more material be handled, but this at a lower cost per cubic yard. The standard equipment of the shovel and dragline consists of wound-rotor motors, magnetic contactors, master controller and transformer.

Adjustable Motor Anchorage

For the purpose of adjusting motors of 20 hp. and over upon their bedplates the Adjustable Anchorage Co., of Detroit, Mich., has recently placed upon the market the adjustable anchorage here illustrated. The device is simple, reliable and positive. It is particularly advantageous for motors equipped with magnetic clutches, although it is useful on motor driving belts. Heretofore



ADJUSTABLE ANCHORAGE FOR MOTORS

motors have not infrequently been dowelled in place. Any change in location of a motor so positioned is difficult, slow, and often entails injury or destruction to the concrete foundation. With this new device slight changes in the position of the motor may be readily and quickly effected, the only tool necessary being a suitable wrench.

Experiments on a New Pump to Withstand Acidulous Mine Water

Because of the exacting and adverse conditions under which mine pumps are operated, engineers and mining men are manifesting considerable interest in the outcome of certain experiments now being conducted by the Midwest Engine Co., of Indianapolis, Ind., on a pump of new design which is constructed from more resistant metal than is at present employed in mine pump-making.

The new pump will be of the duplex, double-acting, power-driven plunger type, unusually rugged in construction and driven by helical instead of spur gearing. It is designed theoretically to withstand the most severe duty imposed by gritty and acidulous mine water.

Builders have long attempted to overcome the rapid deterioration in pumps arising from mine conditions. In the anthracite region especially an unusual amount of sulphuric acid is encountered in the mine water. Under these circumstances the life of the average mine pump is at best short.

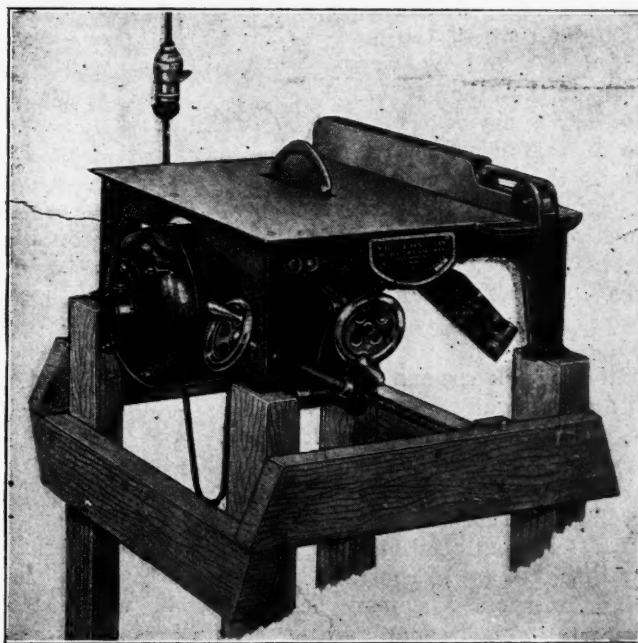
In view of this condition the experiments referred to are being conducted to develop a metal of such a composition as to withstand deterioration due to acidulous water. Already a cast iron has been developed that shows a tensile strength as great as that of steel.

With this new pump the designers expect to provide a construction that will stand up against the abrasive effect of gritty and acidulous water and to secure vastly longer pump service than has been the rule with power models.

Handy Portable Saw for Mine Use

A light, portable and relatively cheap circular saw that can be connected to an ordinary lamp circuit, and which should prove a valuable asset in the mine carpenter's shop, is shown in the illustration. The saw is operated by a $\frac{1}{2}$ -hp. General Electric motor fitted with ball bearings, and is capable of readily handling any wood up to 2 in. in thickness. In addition, it can be used for grooving lumber of any thickness. This saw should effect a considerable saving on routine work such as the irregular cuts necessary in some of the material going into mine cars and other construction.

A novel feature of the saw is the arrangement for tilting it, together with the motor, at any angle which it may be desired to cut. The saw differs in this respect from most others of this type, which usually tilt the table itself, allowing the saw to remain stationary. One of the chief advantages of this arrangement is that it facilitates cutting long pieces that would have a tendency to slide off the table when this is not horizontal. The exact angle of the cut may be readily fixed



SAW WITH PROTECTING GUARD IN POSITION

by turning the small handwheel. Once set there is no danger of the angle becoming deranged.

In cutting grooves, the saw can also be raised or lowered to cut any depth up to 2 in. This is regulated by a small handwheel like that used for controlling the angle of cut.

The saw shown has the shutter saw guard in position. As the material moves in to the saw, this is slowly moved back by an ingenious device, thus protecting the operator's hands. The device also eliminates the catching of the tail end of the stock in the back of the saw. The tool is manufactured by J. D. Wallace & Co., 1401 W. Jackson Boulevard, Chicago, Ill.

EDITORIALS

Prospect of High and Higher Prices

A CARTOON does not create ideas. It merely expresses the ideas after they have once been formed. It cannot create a point of view, it can only recall and strengthen it. As a hyposulphite of soda solution is only able to make permanent a photographic impression already made, so a cartoon can only serve to permanently fix in the brain a thought already outlined therein.

Likewise, when labor is represented in a cartoon as defending high prices, one is disposed to wonder what is intended. Surely, it will be said, labor is always most querulously objecting to an increase in price. Yet it is the laboring man who is the defender of the high prices he deprecates. It is his higher wages that causes prices to be so high. He gets from 80 to 90 per cent. of the product of his toil as wages. Much of the other 10 or 20 per cent. is payment for the use of past construction of labor. So the price of the labor is a very large part, sometimes the whole price of the article produced. High prices inevitably result from high labor costs. They cannot be divorced.

Similarly, labor and capital are so usually considered to be enemies that when they are, in a cartoon, joined as friends we must have them shaking hands as people just introduced or embracing one another as if suddenly convinced of a new-found fraternal relation. All of which is a sign that our thoughts are so contrary to the truth that symbols fail, for symbols cannot be intelligible where the thoughts symbolized are lacking in our brains. So, to use our simile, it is necessary to expose a new plate to which the fixative solution may perhaps be successfully applied later. We must do our arguing first and look for the cartoon to tell the story pointedly later. It is needless to emphasize that the cost of labor will remain up, for the unions will not let it come down. Whoever would reduce prices must take up his battle with labor.

Business men in general know that their own prices are on a bedrock except insofar as they threaten even to rise still higher as the outcome of a strike. They, themselves, refuse to sell at any other than the price they have set, for that price is such that only by obtaining it can they make both ends meet. Yet they are ready to believe that all other men are different from themselves. They expect every moment that the man from whom they buy will divide his prices almost in two

and get back to a pre-war basis. They forget that their own prices are, and must continue to be, as greatly inflated as his—till the price of labor goes down, a time that will never arrive.

Even the interest-on-investment account is more or less based on labor, though the interest now charged may even be double that formerly provided. A factory built and equipped ten years ago cost less that would another of like character built today. But as the old factory competes with the new one, its value is bound to increase, and its owner can charge an apparent profit, for indeed it is only apparent. It may be shown that it is for the public advantage for him to do so, nor is it an unethical act so to do.

Let us take up in order the contentions for this argument. With higher prices for construction, building will not become active till higher book profits on completed buildings or, what is the same, higher rents become general. That may be readily conceded. The public wants more building, and what increases the amount of building helps the public.

As for the ethics of higher charges, it may well be shown that the old building was erected by the dollars of, say, 1909, and the rent and profit is collected in the depreciated dollars of 1919. If a building cost

\$100,000 in 1909, 10 per cent. for interest, repairs and depreciation would amount to \$10,000. Today the receipts on the investment would be paid not in real dollars, but in 60c. dollars, which would not bring the owners as much goods or make as much repairs or replace as much of the building as in 1909. The return would be equivalent to \$6000 in the currency of the year of construction.

On the whole then, labor, past or present, is the cause of almost all elements of cost and therefore the base of all price. The element of past labor has not yet got in its finished work. In a short while, however, it will do so everywhere as will be shown by a general increase in rents. When it does complete its mysterious work there will be a further rise in costs of all articles, but the increase in cost due to the raise in wages of the body of workmen to whom the war has brought a salary not adequate to the demands of a new cost of living will be a still more important factor. Perhaps, also, further wage increases, unjustly granted to bulldozing unions who want all for their little group of workingmen, will be an even greater cause of an ever-increased cost of everything.



LABOR to CAPITAL: They will have to down me, too, brother, before they take away what is tied up in this poke.
NEARLY 90 PER CENT. OF ALL COMMODITY COSTS ARE FOR LABOR, AND HIGH PRICES CAN NOT COME DOWN UNLESS LABOR CONSENTS

When the governors and mayors met recently they elected to discuss the shortcomings of the national government and of business, whereas little has been more disturbing than the action of the governors and mayors themselves; and they had plenty of room for searchings of heart and purpose. More municipal and state construction, it would seem, went on during the war than is going on now, though everybody agreed that such work hampered hostilities. But the governors and the mayors utterly failed to see their obligations and avoided the issue. The public wants the business men to accept all the risks of resumption, and the members of the conference are unwilling to urge upon the people the commencement of any construction work for which they do not make a spontaneous demand.

Adequate Ventilation and Big Tonnage

ONLY by good ventilation can men put out an adequate tonnage. The air should be so readily cleared that the miner is able to return to his place within ten minutes after he has fired his shot. However, it is hard to make the average operator realize this; he has been so accustomed to see the miner wait on the entry for the clearing of the air. We have all seen that worthy many a time, with his coat thrown, like the sheepskin of Hercules, over his shoulders watching the slowly eddying currents taking the air out of the working place or viewing them with disgust when they actually turned around and carried the smoke back to the scene of his operations.

The miner also seems unable to comprehend that he is entitled to such ventilation, so long has he done without it and so adaptably has he trained himself to fill in the interim by taking a piece from his pail and visiting his neighbor's place and so ready is he to go home when his afternoon shots are fired. In some poorly ventilated mines a man is almost suffocated if he stays an hour after the round of evening shots, and as a result each man races with his fellow to be the first to fire.

With our tonnage system good ventilation, if there is any, must be provided by the operator and cashed in by the employee, so the air supply rarely gets up to the level of the law and often falls below it. The metal-mine operator is not waiting for the law. He is going ahead of it, for running his mines by the day, he cashes in on the improvement in production resulting from his expenditures. In less than three years certain metal mines in the Southwest increased their production per man 150 per cent. Whereas, before the improvements, the men mined about 2.8 tons per shift, after the changes were made they mined about 7 tons. The cost of mining dropped from \$1.63 to about 82c. per ton.

Of course, there were many causes of variation in product and cost, some of which worked doubtless in the opposite direction to the tendencies shown; but nevertheless the credit for the improvement has been largely and rightly, laid to better ventilation. Undoubtedly these mines were warm and disinclination to work in humid and warm air had as much to do with the improvement as the ability afforded the mucker of making a speedy return to work after shooting. But to show that work was being hampered by the lack of air, it may be said that 110 million cubic feet of compressed air were used before the improvements and barely 80 million after

them. The air was evidently being used to clear the places of smoke. The best way to prevent this waste of compressed air where compressed air is supplied is to afford a better means of allaying the nuisance arising from bad air. This loss at any rate, where it is encountered, is a loss to the operator and not to the employee; and insofar as good ventilation will prevent it the successful meeting of the difficulty will prove profitable to the operator.

It is estimated that at least \$500,000,000 in interest and dividends will be due yearly to the United States from foreign debtors. Unless our widely heralded goodwill and warm friendship for European countries is mere talk, we should not expect these foreign nations to pay their debts to us in cash here. Even if such a plan were feasible it would lose for us, not only our leading position, but also deprive us eventually of our foreign trade. Consequently, if we are not to be paid in gold over here, we must use the foreign money we are to get over there to make foreign reinvestments. America can no longer live in isolated fashion. We must improve and run foreign factories, build foreign railroads, send agents to buy goods direct at production, points and establish banks throughout the world so as to keep the American dollar at full value.

Our National Honor Engaged

THIS country made good in its war. Germany had sneered at us "money-grubbing Yankees." She had proclaimed we would not fight; that we could not fight. Having seen raised the army she said couldn't be raised, she declared it never could be transported overseas. It was transported overseas. Men of that army broke the famous Hindenburg line, and went through the Argonne, which had been considered impregnable.

More than that, the whole country stood behind its fighters. We shifted the entire industrial system of the land to war purposes. By the labor of those men who were not considered essential to the country's military purpose and the devoted efforts of loyal women, we heaped up a tremendous supply of munitions and war materials which, quite as much as the valor of our men, contributed to the early ending of the war. We bought issue after issue of Liberty Bonds, so that the Government might have money for its war purposes, oversubscribing every loan so that there might be no mistake, either here or in Germany, about our deadly earnestness in the great cause.

We have a right to a great pride in our soldiers and a great satisfaction that we backed them so loyally. But pride in what has been won must not blind us to the fact that there remains a further task. That is the paying up of the war's bills. Our victorious soldiers are returning. They have done their work. We shall not have completed ours until the Victory Liberty Loan, which is to settle the debts, has been subscribed.

Our national honor is engaged in this, just as it was in the military phase of the war. The United States, a leader in the great task of helping the world to peace, prosperity and freedom, must not be a debtor at home. It is an obligation resting on each of us to see to it that this final undertaking of the war is accomplished. We cannot—must not—quit until the success of the Victory Liberty Loan may be ranked with the success of our fighting men.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Sanity seems to be reasserting itself in the mine workers' ranks. Steady work will probably remove most of the fads which have misled even the best of them. The very leaders who have called loudly for changes will cease their clamor in the face of a steady demand for coal. The anthracite districts are already working more steadily and in a short while the bituminous region will also show the tonic effect of steady work.

The operators sympathize with the men who have been harried to work hard and then have been told that they have mined so much coal that they must lie idle till the fuel they labored so hard to produce is entirely exhausted. The mine owners also realize that closing mines is a form of eviction, an act of efficiency and of prudence, perhaps, but one not without its painful sides. They know that permitting the miners to work while the day men are idle reduces the hours and pay of the day men. But prices are low and conditions are difficult. The companies cannot run steadily if people will not buy, and they can't get out coal economically and pay their way if they hire men more hours than the work to be performed demands.

Steady demand will correct all the difficulties, and the market should try and provide it. Above all the Government should do its utmost to relieve the situation. It should not, as has the Railroad Administration, try to lock out the mines and so make it compulsory that a lower wage be paid mine workers and a lower price be charged for coal. The mine workers are surely entitled to their present pay and should not yield to the Railroad Administration in its apparent determination to seek from the coal industry the money whereby to pay its own men the increases in wages just granted.

Only Fair Price Will Secure Fair Wage

Governor Sproul's action in sustaining the anthracite operators in their contemplated readjustment of prices May 1, when a 10-cent increase per ton per month is to become effective for five months, is warmly praised by Thomas Kennedy, president of the United Mine Workers of the Seventh District.

"The statement of Governor Sproul," he said, "shows a broad and intelligent understanding of the anthracite situation. I am more than pleased when he says we are all anxious that the present wage scale in the anthracite region be maintained. That coming from the chief executive of the state will, in my opinion, silence those who had hoped to reduce wages and will do much to stabilize the anthracite trade."

Anthracite Labor Makes New Rules

Circulars warning all miners to refrain from cutting or loading coal on idle days will be sent to all locals in the three anthracite districts immediately. This action has been decided upon by the tri-district officials. Only necessary repair work about the mines will be permitted on days when the mines are not being operated.

The board favors a 70 per cent. compensation pay, starting the second day after the injury, instead of the 50 per cent. now allowed.

The board is arranging for a tri-district convention to be held in September to frame the new demands of the miners, which are to be presented to the operators at the expiration of the present scale, which expires Apr. 1, 1920.

West Virginia Celebrates Eight-Hour Day

The celebration of the second anniversary of the establishment of an eight-hour day for the miners of West Virginia was observed at Rivesville, W. Va., on Apr. 1 and was featured by an address by President F. C. Keeney of District 17, in which he attacked Bolshevism in all its aspects. He said in part:

"I sent out a circular letter some weeks ago, which I desire to explain at this time. The United Mine Workers of America have done more for the miners than any other organization ever can hope to and it objects to the radical policies of the Industrial Workers of the World and other similar institutions, the success of which would bring about the destruction of the union.

"The rules of the United Mine Workers stand for the expulsion of members who cherish such ideas as Bolshevism and if the local does not have spine enough to expel them I will go there and expel them myself. Much evil is cloaked in Bolshevism. Perhaps you don't understand Bolshevism. Neither do I, but I am opposed to supporting any such radical movements."

The opening part of Mr. Keeney's address dealt with the history of the eight-hour day. It was started in 1898 in Illinois, where the miners had to submit to a cut in wages in order to establish it. The idea, President Keeney stated, was one of years' standing, having been advocated by John Synie, of Pottsville, Penn., fifty years ago—shortly after the Civil War. His own followers persecuted him, although he was an ardent believer in the rights of the working man and a "real labor leader," as Mr. Keeney put it. He recalled how Synie went to Indianapolis from Pottsville, Penn., on foot to attend conventions, which, in all, probably represented only 2000 or 3000 miners.

Forty-eight years afterward on the same spot—Pottsville, Penn.—John P. White, international president of the United Mine Workers of America, inaugurated the eight-hour day.

The eight-hour day did not make its appearance in the State of West Virginia until Apr. 1, 1917, when Mr. Keeney inaugurated it after a tenure of office of only a few months. Last year the Kanawha Coal Operators' Association with operations in the southern part of the state sanctioned the day and upon the letting down of the non-union bars in the Fairmont field it was celebrated there this year. The eight-hour day leaves the foreigner with two more hours in which to acquire a knowledge of our language and laws. He should not fail to take advantage of this opportunity. Nor is he the only one who should use this larger waking rest period with profit. Even American workmen should seek in it an opportunity to add to the training already received in the public schools.

Should Binder Figure in Coal Thickness?

It may require the services of an expert to settle a dispute between the miners and operators of the Elkins field as to when "coal" is coal or when "coal" is not coal, the controversy having arisen in connection with an agreement covering the mining of coal in the Pittsburgh bed.

The agreement calls for the mining of coal in that vein of 5 ft. or more in height or thickness. The question has now arisen whether the "binder" is included in that measurement. Miners insist that under the agreement it should be included. The operators take the position that it includes only 5 ft. of actual coal and excludes the binder. While no agreement has so far been reached at the one conference so far held, it is felt that it will be possible to reach an agreement when the parties to the controversy meet a second time.

Coal-Mine Labor the World Around

On Apr. 1, Frank S. Hayes, the president of the United Mine Workers, stated that he and Robert H. Harlin, of Seattle, would go to Paris to urge upon President Wilson personally the need and desire of the mine workers for the development of the export coal business of the United States. The leaders expect to visit Mr. Smillie, in Great Britain, and to see other British labor leaders, who will perhaps, convince them that the British are seeking the same end and that the natural ambitions of the Allies—no, that is not the correct word—"Associates"—are conflicting.

The W. J. Rainey Coke Co., in the Connellsville region, as related in the issue of Apr. 3, has had a strike because of its determination no longer to give free powder to miners. The mines have resumed operation. The product of the ovens of this company used to go in part to the Pittsburgh Steel Co. That corporation has acquired the W. Harry Brown properties; and the ovens formerly belonging to that operator, which were shut down, are now being put to use again. It is natural to wonder if the W. J. Rainey operation will be as active as in the past, now that this rearrangement of ownership has been effected.

The Ohio mine workers have been protesting through President Hayes, of their union, against the discrimination in purchasing exercised by the railroads. Director Hines has replied that the matter is left to the determination of the various railroads, which buy in accord with their needs.

LIMIT TO WORKING LESS AND DOING MORE

In Alabama, President J. R. Kennamer, of District No. 20, has declared in favor of the six-hour day for mine workers on the ground that the air is impure and cannot be endured for a full eight hours. It is regrettable, if that is the case, though it may be true in some of the smaller operations. There is surely no need for it, and in up-to-date mines the air is unusually fresh and invigorating, far more bracing and life-preserving in summer than the stuffy climate of the oversoil.

Mr. Kennamer alleges that it has been proved that more has been achieved in the mines in eight hours of work than can be accomplished in ten. Everyone awaits his proof, but perhaps it was true in Alabama where the change in the duration of the day was concurrent with the war excitement. Under such circumstances the larger working efficiency might well be ascribed to the enthusiasm resulting from the war rather than to the working of an economic law.

It is surely permissible to ask him to "quote chapter and verse" for his statement. True, Paul F. Brissenden, of the Bureau of Labor, did in 1917 try to show that shorter hours had increased production in the anthracite region, but his figures did not prove it as was shown editorially in the issue of *Coal Age* of Sept. 8 of that year. His figures showed just the reverse.

But if the figures showed just what Brissenden said they did, there is no reason to suppose that, taking them as a basis, a man would do more in six hours than in eight; or, for that matter, in four hours than in six or in two hours than in four. To carry the reduction to the limits of absurdity, we might declare that if he didn't do any work at all he would achieve more than if he worked for two hours every day. Kennamer is the "devil's advocate" when he thus talks to his Alabama audiences. He means well, doubtless, but the effect is equally mischievous whether his purpose is well or ill.

WANT SHORT DAY IF COMPETITION PERMITS

From Lethbridge, British Columbia, comes a perfectly sane statement on the six-hour day from President Christopher: "Regarding the six-hour proposition: We are still in favor of this, but how many of us really believe that it is possible to bring this about in this district while the other coal fields competing with this district in the same markets are working from eight to ten hours a day? It is at present a matter of competition in the markets, and no one, no matter how desirous of bringing about a six-hour day, can gainsay the fact."

This, however, is not enough. Competition is not the main cause for a failure to reduce the hours of work.

Canada can reduce laboring hours as well as the United States when the mine workers of the United States so determine and the public is willing. But neither ought to reduce hours till they are about to be reduced in other industries, and until the mine workers and others are willing to sustain the inevitable loss that the shorter day entails they should remember that shorter hours mean less product; that is, less goods created and less goods to divide. The wage could be made the same for the shorter working period, but that would do no good, for six hours' work can give but six hours' product, and there then will be but six hours' product to divide. If we fail to bake our cake it is sure we shall never eat it.

At Thurber, Tex., all the coal-mine operators of the Texas & Pacific Coal and Oil Co., numbering about 300, went on strike the week before last, remaining out for several days pending a settlement of their grievance which arose over the wage contract. The matter was finally settled through the efforts of the officials of the miners' union.

BRITISH WORKMEN ACCEPT SANKEY WAGE PLAN

British mine workers seem to have been satisfied with the Sankey decision. They are disposed to believe that it concedes almost all they could possibly hope for. Even the Welsh mine workers voted 6 to 1 in its favor when the question of accepting or rejecting it was submitted to their vote on Apr. 11. No mine workers in Great Britain are more disposed to make large demands than the men in the South Wales field. Now that even they are satisfied the matter is disposed of for a while till a period of agitation has managed to create a new discontent with the award. The mine leaders must yearly give an account of their stewardship. Larger pay, shorter hours, democratic control of industry, nationalization or something must be sought, otherwise the mine workers will think their leaders remiss.

In Germany many strikes have recently occurred. On Mar. 29, 30,000 men were on strike in the mines around Essen, thirty shafts being closed down. In Witten and Dortmund, and indeed elsewhere, the trouble seems to have a Spartacist origin, the demands made including one for the withdrawal of Government troops. An increase in wage of 25 per cent. was asked, also additional bonuses and the six-hour day.

A meeting of delegates of the revolutionary mine workers representing 195 mines voted at a meeting in Essen that they would strike on Apr. 1 and discontinue work till their demands were fully granted. The men wanted all political prisoners released, the disarmament of the police in the mining districts, and payment by the Nation for every day the men had been on strike. They sent a message to the governing council at Budapest containing brotherly greetings and declaring that they were inspired by the victory of their Hungarian comrades over "the accursed class." They promised that they would fight with their Hungarian and Russian brothers with all their means to compel the establishment of a Socialist Soviet government.

ALL GERMAN MINERS SEEK CHANGED CONDITIONS

The mine workers mentioned are classified usually as of the Ruhr Valley. When they struck, the revolutionary mine workers of Central Germany and Silesia declared themselves as sympathetic and made demands on their own behalf, declaring that if these demands were not granted by Apr. 9 they would cease even emergency work. Thus the mines would be flooded. They condemned all those who had joined the army in response to Herr Noske's appeal. At that time, Apr. 6, there were 345,000 men on strike, and 215 mines were thus thrown idle.

The revolutionists were using intimidation to compel every one to enter their ranks. A Council of Nine, thoroughly unrepresentative of the miners, has been formed. It consists solely of Spartacists and communists. The revolutionists declare that they will allow none other than this *ex parte* committee to represent the mine workers in handling matters with the government.

At the same date the men at Dortmund were reported going back to work. Nevertheless the strike was growing larger hour by hour and it was steadily embracing more occupations. Since then conditions have been becoming increasingly chaotic.

To Have More Money



All we need in order to have more money is more printing presses. But what we need is not more money but more goods; and how will we get goods unless we work for them?

There was a King named Midas who, the Fable says, turned everything he touched to gold. He nearly starved to death. The unions may so arrange it that every way a workingman may look he will see wages,

but if he doesn't work and if other men don't work, he will starve to death like Midas.

We can't let "George do it." We must all work a reasonable length of time each day or there will be nothing else but wages; and it is a fact wages never have and never will make good eating. What we need to worry about is not how to get more money, but how to make more goods.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Certification and Safety

Letter No. 2—I was deeply impressed with the able remarks of James Touhey, *Coal Age*, Feb. 20, p. 374, in which he criticises the attitude of the members who attended a recent meeting of the Coal Mining Institute of America, at Pittsburgh, Penn., when one of the questions discussed was "Has the law permitting the employment of uncertified officials in coal mines been detrimental to the efficient and safe operation of the mines?"

Mr. Touhey states that what appeals to him, in this connection, is the fact that "an intelligent body of men meeting to discuss questions of vital interest to their calling should not arrive at some definite conclusion." He admits that the holding of a certificate is not a guarantee of the competency of the man. The same was also admitted by those who took part in the discussion of this question, at the Pittsburgh meeting, it being claimed that the certificate was merely "an index" of the man's competency.

While I deem it unwise to criticise the actions of examining boards and other intelligent bodies, such as I have witnessed at Owens College, Manchester, and Watson's College, Edinborough, especially when one holds, as I do, mine foremen's certificates granted me, both in Great Britain and in the United States; yet, to my mind, there is a great lack of efficiency in the examining boards in both countries, in respect to the practical experience that should be required of men authorized to examine candidates and grant certificates of competency for mine foremanship.

EXPERIENCE REQUIRED OF MINE FOREMEN

The Coal-Mines Regulation Act of Great Britain and the Bituminous Mine Law of Pennsylvania each require that the candidate for a mine foreman's certificate shall have had five years' practical experience in mines. In my judgment, this is where the root of the trouble lies. The man with five years' experience is hardly competent to take charge of a coal mine. He should have at least nine years of practice in the general routine of work underground. This should include besides the mining of coal with pick and by machinery, methods of timbering, pumping, drainage, tracklaying, mule driving and a knowledge of and acquaintance with electric installations.

The nine years' experience, in such general work as I have just named, should include five years' experience in shotfiring and firebossing. He should have, moreover, a thorough knowledge of and acquaintance with the mining laws of the state, before I would consider him a fit candidate for the office.

The work of mining coal is a perilous undertaking, and the man in charge should be possessed of the cream of knowledge, in respect to both the theory and the practice of coal mining. To my mind, there is no question relating to coal mining that is as important as that of the certification of mine foremen.

The statement to which I have referred that, "a certificate of competency is merely an index to a man's ability to act as foreman of a mine," makes it appear that the Board of Examiners who grant such certificates are mere indexes themselves. If this is true, it is high time, in this 20th century, that the coal industry of this country should be represented by boards of examiners who are able to issue certificates of competency that are something more than indexes to a man's ability.

I fully agree with the mine inspector, who, speaking at the Pittsburgh meeting, is reported, *Coal Age*, Dec. 12, p. 1081, to have remarked that "the operator who allows an uncertificated man in an authoritative position in his mine is a criminal." Let me say that the men who make and those who sign the laws that make this condition possible are likewise criminal.

In closing, allow me to appeal to the mine inspectors of the different states who read *Coal Age*, to take part in this discussion, which is intended to show the relation of the uncertification of mine officials to safety in our mines. State mine inspectors are the intelligent heads, generally, of the state boards of examiners. It is to be regretted that so many state mine inspectors are willing to discuss these questions only when they are no longer in office. This appears to me a mystery.

Springfield, Ill.

JAMES N. RODDIE.

Engine-Plane Haulage

Letter No. 3—The proposition presented in the inquiry, *Coal Age*, Feb. 6, p. 293, is an interesting one. It appears that engine-plane haulage had been in use on the 400-ft. incline, which is said to have a grade of 25 per cent. At the foot of this incline, the road leads into the mine and has a uniform grade of $1\frac{1}{2}$ per cent., for a distance of 1000 ft., to the side track where the trips are made up to be hauled to the surface.

Three car trips, weighing $3 \times 5000 = 15,000$ lb. were hauled up the incline from the mine entrance to the tippie. It is stated that each empty car weighs 1500 lb., while the weight of a loaded car is 5000 lb., making the weight of coal hauled in each car $5000 - 1500 = 3500$ lb. It is now desired to continue this engine-plane haul to the side track 1000 ft. back in the mine.

The fall of the 400-ft. incline is $400 \times 0.25 = 100$ ft., while the fall of the mine road, in 1000 ft., is $1000 \times 0.015 = 15$ ft., which makes the total fall from the tippie to the side track 115 ft. Now, if it was practicable to build a uniform grade from the tippie to the side track, the total length of such grade would be 1400 ft., and its inclination $(115 \times 100) \div 1400 =$ say 8 per cent., which would make a good engine-plane haulage.

But, assuming that it is not practicable to build a uniform grade, I will estimate on an average speed of hauling of, say 8 mi. per hour, for the empty trip running into the mine, and 10 mi. per hour, for the returning trip when on the mine road, and 3 mi. per

hour on the incline. I will allow 2 min., at each end, for changing ropes and starting the trips.

A speed of 8 mi. per hour is $(8 \times 5280) \div 60 = 704$ ft. per min., which makes the time required for the empty trip to run into the mine, $1400 \div 704 =$ say 2 min., and adding 2 min. more for changing ropes and starting the trip gives a total of 4 min. for the empty trip. Likewise, a speed of 10 mi. per hour is 880 ft. per min., and a speed of 8 mi. per hour, 264 ft. per min. The total time for the loaded trip, then, including the 2 min. for changing ropes and starting, is $(1000 \div 880) + (400 \div 264) + 2 =$ say 5 minutes.

On this basis, the time of making one round trip is 9 min., or, allowing for some delay, we will say 10 min. per round trip. Then, hauling 8 hours a day, the number of trips is $(8 \times 60) \div 10 = 48$ trips; and, for an output of 500 tons per day, the weight of coal hauled per trip is $500 \div 48 =$ say $10\frac{1}{2}$ tons. But, since each car has a capacity of 3500 lb., the number of cars that would have to be hauled in each trip is $(10.5 \times 2000) \div 3500 = 6$ cars.

The question at once arises as to whether the cars in use are strong enough and whether the drawbars will stand the pull of a 6-car trip on a 25 per cent. incline. If the car is too weak for this pull, it may be possible to haul two 3-car trips on the incline, while one 6-car trip is hauled on the mine road.

CALCULATING THE HORSEPOWER REQUIRED

In regard to the horsepower of the engine required for this haulage, I would not care to estimate on a higher speed than 10 mi. per hour on the mine road and 3 mi. per hour on the incline. The greatest load on the engine will occur when the trip is at the foot of the incline and has started up the grade. Assuming a 6-car trip weighing $6 \times 5000 = 30,000$ lb., and adding 300 lb. for the weight of the rope on the incline, the total weight hauled is 30,300 pounds.

Estimating the grade on the pitch distance, the sine of a 25 per cent. grade is 0.25 and the cosine 0.968. Then, taking the track resistance as 20 lb. per ton, the load on the engine when the trip is near the foot of the incline is

$$L = 30,300 \left(0.25 + \frac{0.968}{100} \right) = 7868 \text{ lb.}$$

Then, allowing an efficiency of the engine of, say 80 per cent., the required horsepower when hauling at a speed of 264 ft. per min. is

$$H = \frac{7868 \times 264}{0.80 \times 33,000} = \text{say } 80 \text{ hp.}$$

When a loaded trip is starting from the side track in the mine the horsepower exerted by the engine must be calculated for a speed of 880 ft. per min., and a total load, including the weight of 1400 ft. of rope, or say 31,050 lb. In this case, the sine of the grade angle is 0.015 and the cosine 0.999. The load on the rope is then

$$L = 31,050 \left(0.015 + \frac{0.999}{100} \right) = \text{say } 500 \text{ lb.}$$

The horsepower developed when hauling this load at a speed of 880 ft. per min. is

$$H = \frac{500 \times 880}{0.80 \times 33,000} = 16\frac{2}{3} \text{ hp.}$$

This calculation may enable us to make some modification, in respect to time allowances and speed, that would reduce the required horsepower on the incline.

However, it is always wise to have a good margin of engine power to offset any unforeseen delays or occurrences that are liable to happen in mine haulage. The size or dimensions of the engine required will depend on the steam pressure available. W. H. LUXTON.

Linton, Ind.

Drawing Pillars in Machine Mining

Letter No. 13—Referring to the letter of D. F. M., *Coal Age*, Feb. 27, p. 415, regarding the drawing of pillars with machines, I was glad to see that he made clear, in that letter, how these pillars should be attacked, namely, on the side opposite to the falls. I have, myself, had considerable experience in cutting pillars with a Sullivan CE7 machine; and, also, with a Goodman shortwall machine. To attack the pillars on the side nearest the falls, as indicated in a previous letter, would surely result in a considerable loss of pillar coal and run the risk of losing a machine.

As D. F. M. has shown, the plan he describes can be adapted either to the retreating or the advancing method of mining, and rooms can be driven off one or both entries of a pair of headings. However, in order to keep the straight rib and the track next to it, on the opposite side of the pillar from the falls, it is necessary to always widen out the rooms in the direction in which the new rooms are being turned, or the direction in which the work is proceeding.

For example, in the retreating system, the headings are driven to the line or boundary and the first rooms are started at the inby end. In that case the rooms should all be widened out toward the main heading, leaving the straight rib and track on the side of the room toward the boundary.

MANNER OF WIDENING ROOMS EXPLAINED IN DETAIL

Assuming the butt headings are driven to the left of the main headings and explaining more in detail, rooms driven off the first left entry when retreating must be widened to the left, while those driven off the second left entry must be widened to the right. This will always keep the track on the opposite side of the pillar from the falls and enable the machines to work on that side when cutting out the pillar.

On the other hand, in the advancing system of mining, the first rooms are started a short distance from the mouth of the cross-entries and widened out inby, as shown by the plan given by D. F. M., in his letter, page 415, to which I have referred. In this case, rooms driven off the first left entry must be widened out to the right, while those driven off the second left entry are widened to the left.

Again, if the butt entries are driven to the right, as shown in the figure on page 145, the rooms driven off the first right entry must be widened to the left, and those driven off the second right entry must be widened to the right. In each and all of these cases, the straight rib and track must be kept on the opposite side of the pillar from the falls to enable the pillars to be attacked with safety on that side.

Undoubtedly, the retreating plan would give better results, in respect to the complete recovery of the coal, and there would be less liability to squeeze. But, if the roof is not too strong and will break within a reasonable space after the pillar and standing timber have been removed, it will be more economical to adopt the advancing system.

In the case cited in this inquiry, let me suggest that the rooms should not be driven more than 20 ft. wide, nor have a greater depth than 250 ft., especially if wooden rails are used in the rooms, as it will be difficult to get men to push cars a greater distance than this over wood rails. The pillars should be not less than 16 or 18 ft. thick between the rooms.

All entries should be driven on 60-ft. centers and protected by 40-ft. room stumps. Track should be laid on one side of the room, and three good posts should be set for each 6-ft. cut made in the room. In drawing back the ribs, the three cuts the machine makes can easily be loaded without having to lay a switch in the crosscut.

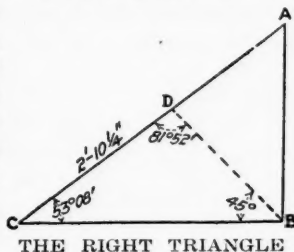
DANIEL F. SMITH.

Wellsburg, W. Va.

Turning Rooms Without Sights

Letter No. 1—Kindly permit me to refer to the idea presented by Ostel Bullock in *Coal Age*, Feb. 13, p. 306, and to say that his suggestion of a device for turning rooms at a right angle with the entry, before the permanent sights are set up, is a good one, and can be used to good advantage when turning rooms off a straight piece of entry, but cannot be employed as well where the entry is crooked.

I want to draw attention, however, to an evident error in his statement that the same method can be employed when the rooms are to be driven at an angle of 45 deg. with the entry. In that case, Mr. Bullock says, "It is only necessary to sight from the same point on the entry to a point at the center of the 5-ft. string."



The device Mr. Bullock suggests consists of three small rings connected together by three strings whose lengths are 3, 4 and 5 ft., respectively, as indicated in the accompanying figure. As he has stated, this device forms a right angle at the intersection of the 3-ft. and 4-ft. strings. But, a line drawn from that intersection to the center of the 5-ft. string will not make an angle of 45 deg. with the 4-ft. string, which is in line with the entry.

Referring to the figure, let ABC represent the device, right-angled at B , and draw BD making the angle CBD equal to 45 deg. Evidently, $\sin BCD = 4 \div 5 = 0.8$; and the angle BCD is $53^\circ 08'$. Then, the angle BDC is $180^\circ - (45^\circ + 53^\circ 08') = 81^\circ 52'$.

Then, since the ratio of the sides of any triangle is equal to the ratio of the sines of the opposite angle, we have,

$$\frac{CD}{CB} = \frac{CD}{4} = \frac{\sin 45^\circ}{\sin 81^\circ 52'} = \frac{0.70711}{0.99} = 0.714$$

Therefore, $CD = 4 \times 0.714 = 2.86$ ft.; or 2 ft. 10½ in. Hence, BD is the sight line for rooms turned at an angle of 45 deg. with the center line of the entry; and the point D is, therefore, 4½ in. beyond the center of the 5-ft. string.

E. P. HUMPHREY.

Upper Lehigh, Penn.

Letter No. 2—On reading a recent issue of *Coal Age* (Feb. 13) my attention was attracted to a short article by Ostel Bullock (p. 306), describing a method that can be employed where it is desired to turn rooms at

an angle of 90 deg. with the entry, without first setting up sights.

The device Mr. Bullock describes, being three rings joined by strings 3, 4 and 5 ft., respectively, will certainly give him a right angle. However, he makes a serious mistake when he says a 45 deg. line drawn through the right angle would bisect the 5-ft. string.

In order to obtain a 45 deg. angle the right angle must be bisected and the bisecting line will not strike the center of the 5-ft. string. A line drawn from the right angle to the center of that string would divide the right angle into two angles of about 53 and 37 deg., respectively, instead of bisecting that angle.

Let me suggest, also, if a mine foreman should attempt to bisect the right angle by drawing a line on the roof of the entry to indicate the direction of the 45 deg. room, he could as well draw a line perpendicular to the center line of the entry to indicate the direction of a room driven square with that entry.

JOHN WALLS, SR.

Porter, Ala.

Payment for Yardage and Deadwork

Letter No. 1—Every coal mine has its difficulties and these vary with the conditions existing in the seam and adjacent strata. Mining the coal, in some seams, is accompanied with no end of expense, while comparatively little or no expense attaches to the same undertaking in other seams, beyond the paying for yardage in driving the entries and turning rooms.

Referring to the case presented by G. Stern, *Coal Age*, Mar. 6, p. 464, where the thickness of the coal is said to vary from 3½ to 4 ft., the seam being overlaid with from 4 to 10 in. of slate, above which is 6 or 8 in. more of coal, let me say that the mining of this coal without incurring a burdensome expense will require care and watchfulness.

I may assume that there is a total thickness of, say 52 in. of coal on the average, which with about 8 in. of slate parting makes the entire thickness of the seam 60 in. This seam has, therefore, $(8 \times 100) \div 60 = 13\frac{1}{3}$ per cent. of refuse, which will give no end of trouble, unless some means are adopted to keep the coal clean and avoid the loading of refuse. This will require strict regulations in regard to cleaning the coal at the working face.

MISCHIEF OF A FEW CARELESS LOADERS

Every practical mining man knows that, in working a seam of coal of this character, it will take but a few working places sending out impurities with the coal to lower the quality of the output of the mine and injure its market value. On the other hand, if the coal must be cleaned after reaching the surface, this will add to the cost of production, besides restricting the output of the mine.

Compare, for a moment, the working of such a seam as is here mentioned with that of a good seam of coal of the same thickness but containing no refuse that must be separated from the market product. It is evident that the miners working such a seam have a great advantage over their fellows employed in the seam first mentioned. Let a miner have a few inches of refuse to handle and be given to understand that it must not be loaded with the coal, it is clear he will then be entitled to some compensation for handling this dirt that brings him no revenue.

As an illustration, let us assume that the weight of coal is 80 lb. per cu.ft., or $2000 \div 80 = 25$ cu.ft. per ton of coal in place. Now, suppose a miner is driving an entry 10 ft. wide in a 5-ft. seam. The cubic contents of this seam for each yard driven is $5 \times 10 \times 3 = 150$ cu.ft., and the weight of the coal, per yard, is $150 \div 25 = 6$ tons. Assuming 13½ per cent. of refuse, as previously calculated, the loss in coal when driving such a place would be $0.13\frac{1}{2} \times 6 = 0.8$ ton. If the price of mining is 90c. per ton, this would mean a loss of $90 \times 0.8 = 72$ c.

Calculating this loss, per inch of thickness of slate, having assumed an average thickness of 8 in., gives $72 \div 8 = 9$ c. of loss for each inch of thickness of slate in the parting. This estimate is based on the driving of a 10-ft. entry in a 5-ft. seam, for each inch of thickness of refuse in the seam, the price of mining being 90c. per ton of coal loaded.

It appears to me that this would be a fair compensation to be paid the miner for his deadwork in handling the refuse in such a seam. If the width of the entry is increased to 12 ft., the payment for deadwork would be increased in the ratio 12:10, or 1.2 times. The payment for yardage in such an entry would then be $1.2 \times 9 = 10.8$ c. per in. of thickness of refuse parting. On the other hand, if the width of the entry is but 8 ft., the payment would be $0.8 \times 9 = 7.2$ c. per in. of refuse, for each yard of entry driven.

In coal mining, as in other industries, there are always some honest fellows who plug along when working under difficulties such as these. They make no claim for extra pay, until the work becomes really burdensome. However, when you analyze the situation and consider the conditions that exist in the seam, nothing can be fairer than to establish a price based on such conditions. Then, as the deadwork increases, and the thickness of the refuse parting grows greater, inch by inch, the price paid compensates fairly for the extra labor performed by the miner. Where such an agreement is made with a man working such a place, little trouble is experienced as he is generally satisfied.

Edwardsville, Penn.

LEWIS R. THOMAS.

Firebosses as State Officials

Letter No. 2—Referring to the statement made by Fred Turner, *Coal Age*, Jan. 30, p. 245, regarding the attitude of some firebosses toward the state mining law, and their responsibilities for the safety of the men employed in the mine, it appears to me that any fireboss who fails to comply with the state law, or is willing to do things that he knows are unsafe should have his papers taken from him.

Mr. Turner states that he knows of firebosses who would do anything they are told, without regard to whether the acts are lawful or dangerous to the men working in the mine. Speaking of the fireboss, he says, "His refusal to obey the orders of his foreman would result sooner or later in his discharge." While that may be true, it is no excuse for a fireboss doing anything contrary to the state law, or permitting practices that he knows are dangerous.

A fireboss that has the ambition to do his work well and conscientiously will act the same whether he is employed by his company or the state. Safety is his first consideration, and he will let nothing else control his actions. Suppose, for a moment, there is an entry where firedamp has collected. If the mine foreman

told a fireboss to go and touch a match to the gas, do you suppose he would obey such an order? Then, why assume that firebosses are afraid to refuse to comply with any order that they know is unsafe or contrary to the requirements of the mining law. What firebosses need is a little backbone, which will give them all that is coming to them.

Having worked for a great many mine foremen, as fireboss and assistant foreman, I can say with truth that I have never yet seen the foreman who has asked me to do anything that would endanger the lives of those at work in the mine. The advice of these foremen has always been to "go safe." It is my belief that few operators, if any, would stand for a foreman in their employ, ordering or asking a fireboss to do anything that would be unsafe or contrary to law. A fireboss receiving an order of that kind from his foreman should appeal at once to the superintendent or manager. By so doing, he would prove his efficiency and value.

Speaking of efficiency in a fireboss, let me say that it is not alone his compliance with the law and keeping the mine safe; but his efficiency will depend also on his ability to handle successfully the men in his charge, and look after other matters in his section. By observing where timber, ties and rails need to be removed from places that are abandoned, and taking note of other things, in his efforts to cooperate with the foreman, a fireboss will prove his value in the daily operation of the mine. Firebosses would derive much benefit from meeting together and talking over matters pertaining to their work in the mine. By so doing, they would get better results and be more efficient.

Chambersville, Penn.

JOHN BUGGY.

Belting for Anthracite Breakers

Letter No. 1—A short time ago, I remember there appeared in *Coal Age* (Feb. 27, p. 419), an inquiry by a mechanical engineer who asks for an estimate on the quantity of belting required in the operation of an up-to-date anthracite breaker, on the basis of tonnage of coal handled in the breaker.

Having recently designed such a breaker located in this city and which is 80 per cent. complete, it gives me pleasure to offer the following, in respect to the quantity of belting and rope drives employed:

Two rope drives, requiring 160 ft. of rope;
Eight rubber-belt drives, requiring 415 ft. belting;
Three jig drives, requiring 75 ft. belting.

This plant is designed to prepare and ship to market about 500 tons of coal per day.

FRANK B. DAVENPORT,

Mining and Mechanical Engineer.

Wilkes-Barre, Penn.

Living Conditions at Mines

Letter No. 2—One who has spent all his life, as I have, in and around coal-mining towns, cannot fail to read with deep interest the excellent letter, regarding the effect of living conditions on the successful operation of coal mines, by A. A. Allen, *Coal Age*, Feb. 13, p. 331. The reading of that letter inclines me to add a word or two from my own experience that may be helpful, and I hope to see the subject discussed thoroughly, as it is an interesting one to all who have the welfare of miners at heart.

Being a miner myself, there are two things that I have always noted are a characteristic of this class of workers; and I believe other mining men will bear me out in what I am going to say. When the average miner *works* he works hard, under almost any kind of conditions. When he *plays* he plays hard, which is proved by the fact that our best baseball, football and basketball teams come from mining towns. Now, one can readily judge that men having these characteristics must be provided with surroundings that will appeal to their tastes and assist their development.

My observation and experience compels me to conclude that, in the large majority of our mining towns, coal miners are required to live under the most meager conditions, their lot being worse in this respect than that of any other class of industrial workers. My belief is that it causes the present unsettled condition of miners. They move from one place to another, looking for better conditions in which to live and rear their families, but too often their search is vain.

CONDITIONS UNDERGROUND GOOD, BUT NO LIVING ACCOMMODATIONS IN THE PLACE

Only recently, I was called to look over a proposition where a foreman was wanted. I found conditions in the mine the very best, but the living conditions in the town were unbelievable, in one or two respects. In reply to my inquiry as to where I could find a temporary boarding place, the superintendent looked half ashamed and said, "I don't think there is a place in town where an English-speaking man would care to stay."

The roads in the town were poor, there were no churches, no places for amusement or recreation, and one can judge of the sort of schools that would be found there. To move to such a place, a good miner would have no desire. The class of men employed there were largely given to drink and carousing Sundays and other days when they were not working.

Contrast these conditions with those existing in a mining town where the roads are good, and where there are good schools and churches and comfortable houses are provided for the men. The town is kept in a sanitary condition. The miners are not unsettled and restless, but are a satisfied lot, as one observes them. While there may be one or more saloons in the place, there is not the hard drinking and carousing that characterizes the towns to which I have just referred. A miner may go to a saloon, get a drink and stroll out to see the boys play ball or some other game but after that, he returns home none the worse for his manner of spending the few hours he has above ground.

LABOR, BOOZE AND LIVING CONDITIONS

The statement has been made that to abolish booze would solve the labor troubles. In a sense this may be true, as too many men drink hard and forget to report for duty if, indeed, they are in fit condition to work. Now, I am not speaking a word in favor of booze, as I am a strict temperance man, myself. Let me say, however, that I am convinced that the only way to better labor conditions in coal-mining is to improve the living conditions at the mines. Provide good schools and churches, good roads and comfortable houses with yards and gardens, and see to it that there are places of amusement and recreation. Last but not least, make the town sanitary and a fit living place where a man can safely bring up his family.

At the mine, a good warm wash house should be provided where the tired miner can wash himself and change his clothes before going home. If these conditions prevail at a mine, there need be little fear that miners will become restless. Under proper management, the conditions I have just cited can be made self-supporting, and it goes without saying that they would secure and hold a better class of miners, which would mean an increased production of coal because of fewer idle days when men fail to report for work.

Johnstown, Penn.

OPTIMIST.

Efficiency in Firebossing

Letter No. 11.—Having been a fireboss myself for a considerable time, I always try to sympathize with the fellow who is unfortunate enough to hold that position. I regard it as the most responsible position in a coal mine, and one that should only be given to men whose ability and courage cannot be questioned, inasmuch as the safety of all the men working in the mine is dependent on the fireboss.

The fireboss' task begins when he leaves his bed in the early morning and prepares to enter the mine. On reaching the head of the shaft or slope, he must assemble all his thinking powers for action. In the performance of his work, his ear must ever be alert to catch the sound of a crack or break in the roof or the timbers supporting it. His watchful eye must be able to detect the presence of even a small percentage of gas, by observing its first appearance on the flame of his safety lamp, which is the only light he is permitted to carry when making his examination of the mine.

WHAT THE MINE FOREMAN EXPECTS OF THE FIREBOSS BESIDE HIS REGULAR DUTIES

In addition to the duties that pertain particularly to his office as fireboss, he is expected, by the mine foreman, to make mental note of the number of loaded and empty cars standing in the working places and to be able to describe the condition of each place in his section, in respect to its condition and need of timber or tracking, and report these and other things that may require immediate attention.

On his return to the shaft or slope bottom, his report having been entered in the fireboss book, he must next attend to the miners who are now entering the mine, and notify any who are working in places that he has found to be unsafe, not to go into their places. A little later, he must return to the working face and see that miner 289, or miner 683, has taken down that loose piece of bad top, before proceeding to load any coal, after which he must assist the bratticeman in removing gas from a pitch heading. The fireboss, in answer to the inquiries of the foreman, is supposed to know why John Popolaski, or Salvatore Angelo, are not at work in their places.

These and many other numerous tasks fall to the lot of the busy and efficient fireboss. When he at last starts back to the foot of the shaft, ready to return home, it is only to meet the foreman, who wants to know "Why in h—, is there no more coal coming out?" Yes, the fireboss, if he is a good conscientious fellow, has a happy life of it whenever the foreman so determines.

West Pittston, Penn.

RICHARD BOWEN.

[The discussion of "Efficiency in Firebossing" will close with Letter 15, now on hand.—EDITOR.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

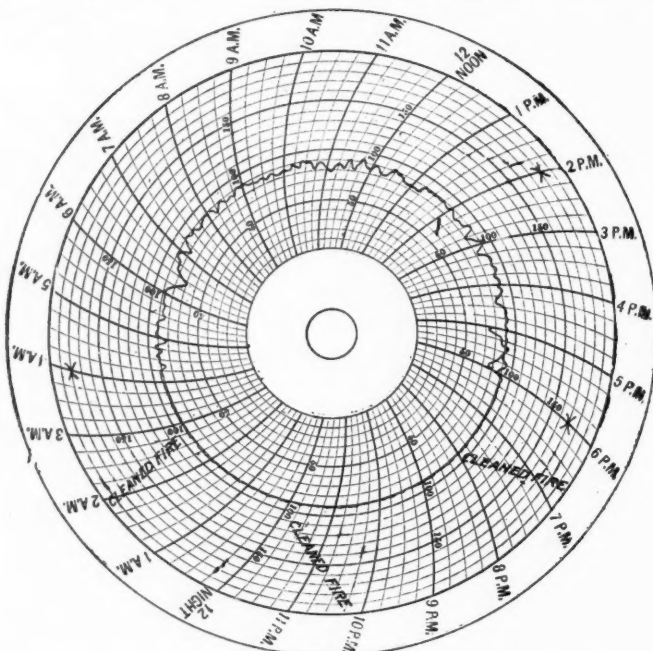
A Remarkable Pressure Chart

I am sending the inclosed Bristol's recording-pressure chart, which represents a 24-hour run at the power plant of the Miami Valley Hospital of this place, and wish to ask for the opinion of *Coal Age* and its readers regarding the chart. It will be observed that the first dayman is in charge doing a 10-hour shift extending from 4 a.m. to 2 p.m.; the second dayman works a 4-hour shift from 2 p.m. to 6 p.m. and is followed by the nightman who works another 10-hour shift, from 6 p.m. to 4 a.m.

The point to which I wish to draw particular attention is the fact that the nightman saved 30 per cent. of coal on his run and, as indicated on the chart, cleaned the fire three times, in his 10-hour shift. He states that the boiler popped off three times in the same shift. The furnaces are fired by hand and equipped with shaker grates. The chart shows the pressures recorded during each shift and speaks for itself, no further comments being needed. I shall be glad to learn the opinions of experienced engineers and firemen who have used this form of pressure chart.

W. F. HARRY, Chief Engineer,
Dayton, Ohio. Miami Valley Hospital.

The remarkable feature of this chart, which is accurately shown in the accompanying figure, is the uni-



BRISTOL PRESSURE CHART OF A POWER PLANT

form pressure line recorded during the nightman's shift. Taken in connection with his statement that the boiler popped off three times during that shift, and the further fact indicated on the chart that the fires were cleaned three times in the same period, one feels justified in assuming that the showing on the chart is not

a correct representation of the pressure in the boiler, during the night shift.

If the boiler popped at all at this pressure, it would have kept on popping if the chart is a correct showing. The only conclusion is that the gage was spiked by the nightman, with the probable intention of producing such a uniform chart, believing that this would reflect credit on him as showing constant attendance on his duties as fireman. In the absence of exact information, it may be assumed that the plant was carrying a fairly uniform load during the day shifts, and the slight irregularity of the pressure line during those shifts is no more than what might be expected especially in a hand-fired plant. Referring to the statement that the nightman saved 30 per cent. of coal on his run, the meaning is somewhat obscure. It is only natural to suppose that there would be a considerable less coal used to run the plant during the night than during the day, and the 30 per cent. saving claimed for the night shift has no particular significance.

From the appearance of the chart, it can be said with some degree of certainty that the dayman who came on at 4 a.m., cleaned fires two hours later, at 6 o'clock, causing a well-defined drop in pressure for a half-hour period. From that time, the chart does not show, by any undue pressure drop, that the fires were cleaned again during the day.

We feel safe in assuming that the night man coming on at 6 p.m. probably did clean fires two hours later, as marked on the chart. We can see no reason, however, why it would be necessary to clean the same fire four hours later, midnight, and again at 3 p.m. The three cleanings marked on the night run would seem to refer to three separate fires. We shall be glad to receive the opinions of our practical readers.

Three Common Safety Lamps

Please explain in *Coal Age* the important differences between the Davy, Clanny and Wolf safety lamps.

Johnstown, Penn.

ASST. FOREMAN.

The chimney of the common Davy lamp consists entirely of wire gauze, while in the Clanny and Wolf lamps the flame is surrounded by a glass cylinder surmounted by a wire gauze. The Davy lamp is often provided with a metal shield, which partially encircles the gauze chimney and protects the flame from strong drafts. The Clanny and Wolf lamps may or may not be provided with a steel bonnet. The bonnet of a Wolf lamp is corrugated and has tangential openings that afford a less resistance to the burnt air and gas issuing from the top of the lamp. While the Davy and Clanny lamps burn lard, cottonseed or sperm oil, the Wolf lamp is designed to burn a volatile oil, as naphtha or naphtha benzine. The oil vessel is filled with absorbent cotton, in order to lessen the danger arising from the use of the volatile oil. The Wolf lamp is also provided with an igniter to relight the flame when extinguished.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Alabama Firebosses' Examination Birmingham, Jan. 20-23, 1919

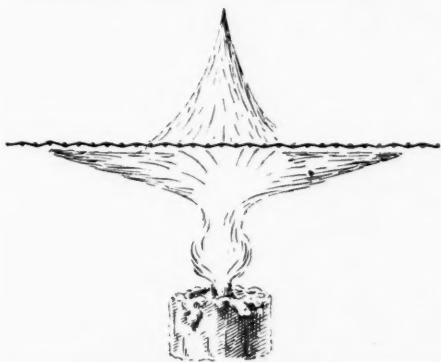
(Selected Questions)

Ques.—Give the names, chemical symbols and composition of the different gases met with in coal mines.

Ans.—The common mine gases are the following: Methane or marsh gas (CH_4), consisting of one atom of carbon combined with four atoms of hydrogen; carbon dioxide (CO_2), consisting of one atom of carbon combined with two atoms of oxygen; carbon monoxide (CO), consisting of one atom of carbon combined with one atom of oxygen; hydrogen sulphide or sulphureted hydrogen (H_2S), consisting of two atoms of hydrogen combined with one atom of sulphur. In addition to these common mine gases may be mentioned the heavy hydrocarbon gases, olefiant gas (C_2H_4), consisting of two atoms of carbon combined with four atoms of hydrogen, and ethane (C_2H_6), consisting of two atoms of carbon combined with six atoms of hydrogen. Methane or marsh gas is a light hydrocarbon and is sometimes called "light carbureted hydrogen." Though not mine gases, properly speaking, there may be mentioned in this connection the oxygen (O_2) and the nitrogen (N_2) of the atmosphere. Under certain conditions, there may also be present in the mine small quantities of hydrogen (H_2).

Ques.—Are there any conditions under which the flame will pass through the gauze of a safety lamp? Explain fully.

Ans.—If the gauze of the lamp becomes heated to low redness in the dark, it is extremely unsafe and flame is liable to pass through the mesh. Also, if the



FLAME PASSES THROUGH WIRE GAUZE WHEN HEATED

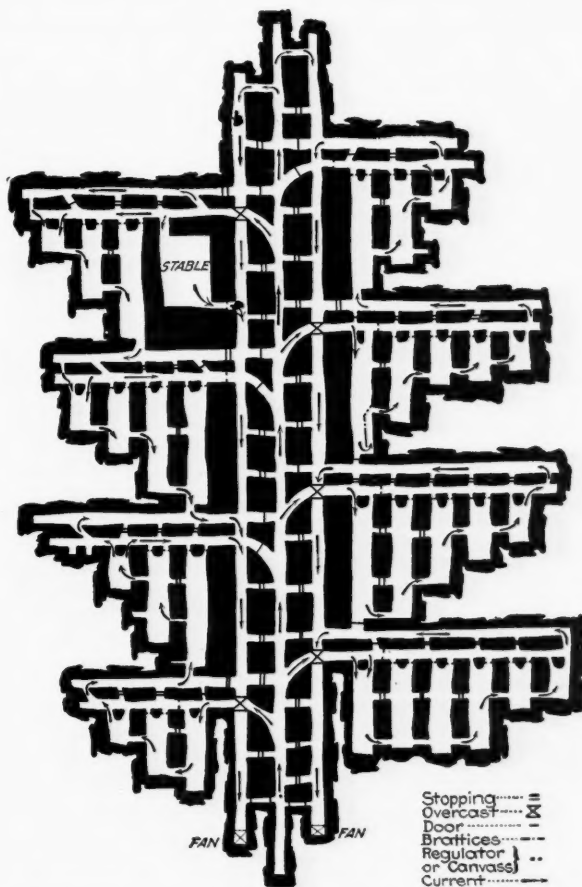
gauze is dirty, or the lamp is exposed to a strong air current or blast of air, or the lamp falls, or if the gauze is defective or has been injured in any way the lamp is unsafe and liable to pass flame through its gauze, especially if handled by an incompetent person.

As shown in the accompanying figure, when the gauze has become sufficiently heated, its cooling effect is destroyed and the flame passes through the mesh, because the wires no longer absorb the heat from the tiny streams of gas and air passing through the gauze and

the flame continues to burn instead of being extinguished, as is the case when the wires are cool and able to absorb the heat from the burning gas.

Ques.—How many cubic feet of air must be mixed with 1 cu.ft. of firedamp to render it harmless?

Ans.—Assuming the firedamp is a mixture of pure methane and air, in the most explosive proportions, or contains 9.46 per cent. of gas, 1 cu.ft. of the firedamp will contain 0.0946 cu.ft. of gas. But, taking the lower inflammable limit of the mixture as reached when it



SHOWING PROPER VENTILATION OF MINE PLAN

contains 2.5 per cent. of gas, the volume of air and gas will then be $0.0946 \div 0.025 = 3.784$ cu.ft. Now, subtracting the original cubic foot of firedamp from this volume gives 2.784 cu.ft. of air to be added to bring the mixture to the lower inflammable limit. For safety, it would be well to add 3 cu.ft. of air to provide a good margin.

NOTE.—Candidates in the firebosses' examination, as well as in the first- and second-class examinations, were required to ventilate the map shown in the accompanying figure. The circulation shown in the figure, of course, did not appear in the original map given to the candidates, but has been carefully indicated here in order to show the proper manner of ventilating the mine.—EDITOR.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Canary Islands Lost Bunker Coal Trade During 1917

The inhabited islands of the Canary Archipelago (Teneriffe, Grand Canary, Palma, Lanzarote, Fuerteventura and Hierro) have experienced great economic and financial depression during 1917 as a result of the war. The withdrawal of all but Spanish vessels from Canary Island ports closed down the bunker-coal trade abruptly. This trade, which in 1914 was valued at \$10,000,000, ceased in January, 1917. No collier entered these ports during the year except small coastwise steamers carrying 300 to 400 tons of low-grade Spanish dust coal. In 1917 there were no imports of American coal, which in 1916 showed a landed value of \$167,840. The total imports of bunker coal in the Canary Islands in 1916 amounted to 110,270 metric tons, valued at \$573,102. In 1917 the tonnage dropped off to 42,000 metric tons, valued at \$281,450.

Germany to Retain Saar Valley

According to recent reports from Paris, the Saar Valley problem has been solved by an economic agreement that will give France certain concessions in the coal supply of that region but which will not militate against German sovereignty. It will be recalled that the French Government has been insisting for some time that the Saar Valley, with its rich coal deposits, be given over to her, basing her contention on the fact that the Germans destroyed the coal mines in the Lens region of France.

All French plans to dominate the Saar Valley and to obtain the entire coal output of the region until the Lens mines were again in operation met with stubborn resistance. The disposition of this question has possibly been the most bitterly fought of all the issues before the peace conference.

Foreign Trade Opportunity

An American consular officer reports that a man in Sweden wishes to secure an agency for the sale of the best quality steam coal. Those who are interested may obtain the name and address by addressing the Bureau of Foreign and Domestic Commerce, or any of its branches, and referring to Opportunity Number 29009. Correspondence with the Swedish agent may be in English.

Hampton Roads Coal Exports

		NORFOLK	
		Cargo	Bunkers
Lambert's Point			
Mar. 31	Amer. S.S. Cotopaxi.....	Vera Cruz, Mexico.....	3,118 600
Apr. 1	Amer. S.S. Hawaiian.....	Rio de Janeiro, Brazil.....	7,425 1,395
Apr. 2	Amer. S.S. Lake Gormannia.....	Barbados, B. W. I.....	3,008 648
Apr. 2	Ital. S.S. Labor.....	Gibraltar for orders (Italy).....	5,679 1,006
Sewalls Point			
Mar. 31	Amer. S.S. Lake Agomak.....	Barbados, B. W. I.....	3,040 513
Apr. 1	Br. S.S. Cuthbert.....	Manaos, Brazil via N. Y.....	1,023 850
Apr. 4	Amer. S.S. Andra.....	Mejillones, Chile.....	2,427 540
Newport News			
Mar. 29	Br. S.S. Baranga.....	Auckland, N. Z.....	4,989 2,010
Mar. 31	Amer. S.S. Lake Ontario.....	Chanaral, Chile.....	1,000 557
Mar. 31	Amer. S.S. Lake Ontario.....	Huasco, Chile.....	1,370
Apr. 1	Nor. S.S. Otter.....	Port of Spain, Trinidad.....	1,952 365
Apr. 1	Nor. S.S. Roar.....	Port of Spain, Trinidad.....	1,167 365
Apr. 1	Nor. S.S. Roar.....	Grenada, B. W. I.....	400
Apr. 3	Swed. S.S. Meta.....	Havana, Cuba.....	2,145 138
Apr. 3	Dan. S.S. Erik II.....	Nuevitas, Cuba.....	2,523 209
Apr. 3	Swed. S.S. Hermes.....	Kingston, Jamaica.....	2,153 242

HAMPTON ROADS COAL DUMPINGS, MARCH, 1919

	Gross Tons
Norfolk & Western R.R.....	412,842
Virginian R.R.....	197,367
Chesapeake & Ohio R.R.....	234,058
Total.....	844,267

Foreign Freight Rates

W. W. Battle & Co.'s coal trade freight report under date of Apr. 17:

During the past week we chartered a number of sailing vessels to carry coals to South American ports, and have a few additional sailing vessels open for this business; but steamers for these destinations are difficult to obtain. We also chartered a number of steamers to carry coals to West Indian ports, and have additional tonnage offered at the Chartering Committee's rates.

We would quote the Chartering Committee's rates as follows:

Steam—Havana, \$7.50, 600 tons dis.; Cardenas or Sagua, \$9.30, 300 tons dis.; Cienfuegos, \$9.50, 500 tons dis.; Caibarien, \$9.50, 360 tons dis.; Guantanamo, \$8.50, 500 tons dis.; \$9.40, 400 tons dis.; Manzanillo, \$9.50, 300 tons dis.; Bermuda, \$9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, \$9.50, 400 tons dis.; St. Thomas, \$10.50, 500 tons dis.; St. Lucia, \$11.50, 500 tons dis.; Santiago, \$5.50, 500 tons dis.; \$9.40, 400 tons dis.; Barbados, \$11.50, 500 tons dis.; Port of Spain, Trinidad, \$11.50, 500 tons dis.; Curacao, \$10.50, free p. c. Curacao, 500 tons discharge. Rio, \$19.50 net, 1000 tons dis.; Santos, \$19.50 net, 1000 tons dis., or \$21 net, 600 tons dis.; Buenos Aires, \$18.50 net, 600 tons dis.; Montevideo, \$19.50 net, 750 tons dis.; Pernambuco, \$18.50 net, 500 tons

dis. To Nitrate Range, \$16.50 gross prepaid.

Sail (maximum) — Para, \$15.50 net; Bahia, \$18.50 net; Pernambuco, \$18.50 net; Rio, \$19.50 net; Santos, \$19.50 net; Rio Grande do Sul, \$21.50 net, 400 tons dis.; Buenos Aires, \$18.50 net; La Plata, \$18.50 net; Montevideo, \$19.50 net. To Nitrate Range, \$16.50 gross prepaid.

American Ambassador Edwin V. Morgan reports from Rio de Janeiro, Brazil, under date of March 27, that an executive decree has been signed withdrawing from foreign vessels the privilege granted by decree 12734, of Dec. 5, 1917, to engage in Brazilian intercoastwise trade.

Coal and Coke Exported from New York in February

Only in the quantity of coke exported from the Port of New York during February of 1919 is there shown an increase as compared with the same month in the two previous years. As compared with February in 1917 and 1918, the tonnage of anthracite and bituminous exported from this port shows a decrease, which may be due in most part to the mild winter and the consequent small consumption. The tabulation below gives tonnage and value:

	1917		1918		1919		1917		1918		1919		1917		1918		1919	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina.....	1,074	\$8,592					1,437	\$5,892			2,017	\$13,485						
Barbados.....					40	\$606												
Bermuda.....																		
Bolivia.....							2	12			300	2,100	738	\$5,899			190	\$1,582
Brazil.....													29	573				
British West Africa.....	20	240																
British West Indies.....	25	199			50	753												
Canada.....	2,970	17,154	945	\$6,177	223	1,840												
Chile.....													75	500			27	915
Costa Rica.....	30	435																
Cuba.....	10	88	45	328			50	225	1,776	\$16,808			5	43	19	\$553		
Colombia.....													2	40				
D. West Indies.....											469	3,142						
France.....	3	36															1,311	18,396
F. West Indies.....													89	1,892			2	65
Guatemala.....	2	14																
Haiti.....	51	715																
Italy.....											500	5,000						
Mexico.....	105	1,234					242	847										
Newfoundland.....			144	1,349														
Norway.....													35	233				
Panama.....													100	805				
Peru.....		1,123									75	1,154	15	239			36	1,060
San Domingo.....	468	4,018	50	323					381	2,540			4	77				
Salvador.....					101	1,285									25	700		
Turkey in Asia.....					201	1,706					200	1,700					20	590
Turkey in Europe.....													119	1,082				
Venezuela.....	125	1,514																
Total.....	4,981	\$35,362	1,184	\$8,177	615	\$6,190	1,731	\$6,976	2,157	\$19,348	3,561	\$26,581	1,211	\$11,383	44	\$1,253	1,586	\$22,608

COAL AND COKE NEWS

EDITED BY J. H. MOSS

Harrisburg, Penn.

Considerable interest has been aroused by the offer of the Susquehanna Collieries Co., owner of two collieries at Lykens and Williamstown, Dauphin County, to sell its holdings to any responsible purchaser. It has advertised to this effect in the Dauphin County papers, but no buyer has appeared to date.

The offer was prompted by the fact that advisers engaged by the Dauphin County commissioners as coal-land experts have appraised the value of the Susquehanna's Dauphin County holdings at \$87,000,000. The company is willing to dispose of the whole tract, with improvements, for \$1,400,000, of which \$400,000 represents the improvements. This is considerably less than 2 per cent. of the appraised value, yet nobody has so far appeared anxious to take a profit of about \$85,000,000 by putting up \$1,400,000. It would seem to be the impression of possible investors that the property is not worth what the county's advisers say it is.

According to mining men, the problems presented in this particular property make it the hardest mining job in the anthracite region. One of the mines hoisted 13½ tons of water for every ton of coal hoisted in 1918, while at the other mine the ratio was 22½ tons of water for every ton of coal. One mine used 22 per cent. of its output for boiler fuel, while the other used 40 per cent. A hearing on the appeal from the new valuation will be held by the Dauphin County commissioners Apr. 17.

With the basic purpose in mind of allowing anthracite coal to be taxed without having it declared unconstitutional by the courts, Senator A. L. Davis, of Lackawanna, in the Senate on Apr. 9 introduced a joint resolution proposing an amendment to article nine of the constitution. The amendment follows:

"Section 16—For the purpose of taxation, subjects of the same nature may be classified according to their physical character or their general use and all subjects of taxation may be classified for the purpose of laying graded or progressive taxes."

This amendment will have to be passed by this legislature and the one two years hence, and then submitted to the people, before it becomes a law.

Senator Davis states that the real purpose in introducing the amendment was so that anthracite coal could be taxed without the courts declaring this method of taxation unconstitutional. There are on the statute books of the state two measures, the Roney bill and the Dawson bill, calling for a tax on anthracite. These measures were passed and signed at the 1915 and 1917 sessions for the purpose of assisting in remedying the mine-cave situation in the anthracite region.

Uniontown, Penn.

Not since 1907 have conditions in the Connellsville bituminous region been at such low ebb as at present. The entire region is now operating upon a basis of 44 per cent., with 50 coke plants and three times as many coal plants entirely out of operation and all others operating upon a greatly restricted basis.

The action of Director General Hines in refusing to accept the Peek-Gary steel price schedule has served to cloud the immediate future of the coke industry with more uncertainty than existed before the conferences were started. The first effect of the present controversy has been to cause a drop of from \$4.50 to \$4.25 in the average price of coke, which was quickly followed by another retrenchment period on the part of the operators. A week ago there was a consensus of opinion that rock bottom in curtailment had been reached. Now nobody will venture a prediction on how much lower it will go.

Four dollars seems to be the lowest figure at which operators can sell any considerable tonnage of coke. Demands of buyers for a lower price has resulted in suspension of operations at a number of plants. For odd lots of coke, however, the price has gone as low as \$3.75, ovens, and in one instance an operator accepted that

price on a contract for a limited period because mining conditions forced him to continue operations, even at a loss. Prompt furnace coke is selling from \$4 to \$4.50, but the range for contracts runs the line from \$4.50 to \$6 with most of the tonnage delivered around \$5.

Output of the Alicia plants recently sold by W. Harry Brown is now being delivered to the Monessen plant of the Pittsburgh Steel Co. The Rostraver dock has been put back into commission after having been rebuilt following its destruction by fire last summer.

Charleston, W. Va.

Coal production in West Virginia during the first few days of April had not regained its stride, even though statistics covering March shipments showed that there had been an increase in the output during that month as compared with February production. In other words, insofar as it was possible to tell, the output was just about at the point it had reached during the early part of March. In certain districts the idle mines were more numerous than they had been in the previous fortnight, and in no district was there any increase insofar as it was possible to estimate.

Taking the state as a whole, the output was not much over 40 per cent. of the total full-time capacity of the mines. Even such business as there was came from consumers who were simply keeping their stocks from running too low and could not be attributed to any additional consumption of coal. On a rough estimate, shipments from West Virginia fields in March exceeded those in February by from 5 to 10 per cent. During the week ending Apr. 5 railroad fuel shipments were somewhat curtailed. Tidewater shipments to all points except Hampton roads were fairly large. On Apr. 1, when the coal year opened, much coal tonnage was not yet under contract, that being especially true as to lake shipments and as to coal for shipment to the West in general.

Improvement marked the course of events in the Fairmont region during the first five days of April. Despite such improvement, however, there was no decrease in the number of idle mines. The improvement was applicable to western as well as to eastern consignments. Production in the Fairmont field was less than half of normal.

At the outset of April New River operators were still being somewhat hampered in their attempt to make eastern shipments by the existence of several embargoes on coal, although the Navy continues to use a large quantity of fuel from New River mines. Much of the tonnage usually going to tidewater is already under contract for the coming year. It will require an increase in western business to stimulate production to any appreciable extent in the New River field. Pocahontas production was diminished somewhat through market conditions.

The condition of the western market was reflected to some extent in the Logan Mining District, where there was a slight decline in production during the week.

Insofar as it was possible to tell production hardly held its own in the Kanawha region during the first five days of April. Further gains will not be made until the opening of the lake trade season, and until that time most of the miners will not average over two days a week. There was some encouragement in the fact that March shipments exceeded February shipments by about 10 per cent. Much coal from the district is still not under contract.

Victoria, B. C.

When the British Columbia Legislature prorogued a few days ago the Lieutenant Governor withheld his assent to the Settlers' Rights Act of 1919, which would have given the old settlers, or their dependents, with homes in the Esquimalt & Nanaimo Railway Belt on Vancouver Island a further opportunity to make application for the coal rights in connection with their property. The issue now is straight cut between the jurisdiction of the Dominion and the Province, and the stake to those

directly interested in title to a large section of coal-bearing lands of the Island.

On the question of jurisdiction the Province maintains that it has absolute power with respect to the administration of matters pertaining to civil and property rights, within which classification comes the proprietorship of the coal referred to. Just what position the Dominion government takes it is not so easy to define, but that it is responsible for the Lieutenant Governor's action in refusing to give his assent to the enactment of the Legislature there is no doubt. It may be that its argument is that title to surface and under-surface rights in these Island lands passed from the Province to the Dominion, and from the latter to the Esquimalt & Nanaimo Railway Co., in 1884; that the Esquimalt & Nanaimo Railway Co. since has sold the under-surface rights to the Canadian Collieries (D), Ltd., and that the latter, having raised a considerable sum on this security, should be protected, if only in justice to the bondholders.

It is to be noted that, because of the action taken by the Dominion Government, the Province finds itself in the position of being forced to defend its right to the sole administration of "property and civil rights" within its domain. These rights are part and parcel of the "Terms of Union" and it is considered most serious, apart altogether from the rights of the Canadian Collieries or of the settlers affected, that the Federal Government should so interfere with Provincial legislation of this character. It is very probable, therefore, that both because it believes the settlers have a good case and have been unjustly treated and because the powers granted the Provinces under Confederation must be upheld that British Columbia will not allow the matter to drop where it now stands.

PENNSYLVANIA

Anthracite

Hazleton—The sixteen collieries of the Lehigh Valley Coal Co. in this district have resumed full-time operation. A number of independent operations that had been working only three days a week will also go to a full-time schedule. The resumption of activity is attributed to the action of Governor Sprout sustaining the prospective increase in the price of anthracite.

Freeland—Indications that the Sandy Run mine of the Kemmerer Coal Co. is to be idle for some time have been given by the action of the officials in ordering the men to remove the mules from the mines. The animals are being sent to pasture on ground owned by the company in Carbon County.

Pottsville—Members of the City Council have gone after the Pennsylvania Railroad Co. for persisting to burn soft coal in its engines in that town. An ordinance has been passed providing a fine from \$10 to \$100 for every day's continuance of the smoke nuisance. Pottsville officials argue that the railroad company should not attempt to burn bituminous coal in an anthracite mining center.

Hazleton—Though miners of the Lehigh coal field are working on reduced time because there is no market for coal, a famine exists in Hazleton and people can not get enough fuel. They let their stocks dwindle, thinking the mild winter weather indicated an early spring. As a result they were caught unawares when the temperature dropped during the week. The mines are operated only two and three days a week, and coal dealers find they can not catch up with orders.

Bituminous

Greensburg—Fire recently destroyed one of the buildings at the No. 2 plant of the Alexandria Coal & Coke Co., located near New Alexandria, with loss estimated at about \$10,000.

Charleroi—The Union Coal & Coke company, which operates all of the mines in the Pigeon Creek valley with but one exception, has moved its general offices from Monongahela to Farmers and Miners Bank Building of Bentleyville. The company purchased the Kuhn interests in several thousand acres of coal lands in Scenery Hill and it is reported will develop that tract in the near future.

WEST VIRGINIA

Monon—An improvement in market conditions has enabled the Monongahela Coal Co. operating at this place to start its mines going once again. More than 100 miners are employed at the plant.

Switchback—The Pocahontas Fuel Co. is considering plans for the construction of a large new coal tippie at its local properties, to provide for increased capacity.

Affinity—The Pemberton Coal Co. has recently commenced the construction of a new power plant and machine shop at its local plant, to be used to facilitate operations. It is understood that a new recreation hall and the construction of a number of miners' residences are also contemplated.

Fairmont—The purchase price paid for a one-half interest in the North Fairmont Coal Co. by Robert Talbott, who acquired such an interest in the concern from Seymour McIntire, W. D. Reed and M. A. Joliff, is said to be \$150,000. The company has its operation in the Fairmont field, its property being between Fairmont and Morgantown.

Bluefield—M. H. Pedigo, Bluefield, and William H. Leckie, Welch, have recently completed negotiations for the purchase of extensive coal properties located on Pigeon Creek, in McDowell County, comprising a total of 1500 acres, and are understood to be arranging plans for the installation of the necessary mining machinery for extensive development.

Nitro—Plans are under consideration by the Fryland Coal Co. for the installation of new equipment and mining machinery, etc., for the development of two new coal mines located in the vicinity of Nitro. It is understood that in connection with this work the company is planning for the construction of a number of miners' residences for its employees. C. G. Howland is president. The entire work is estimated to cost approximately \$50,000.

Fairmont—Another phase in the development of the plans of the Domestic Coke Corporation, of this city, engaged is completing a \$3,000,000 byproduct plant, is the awarding of a contract for the construction of two miles of railroad from the site of the plant to the Baltimore & Ohio R. R., such work together with the rights of way necessary to cost about \$125,000. This is one of the companies in which capitalists identified with the Monongahela Valley Traction Co. are also interested. At the present rate of progress executives of the company are confident that the new plant will be completed early next spring.

Omar—The tonnage of the Main Island Creek Coal Co. will be appreciably increased upon the completion within the next 30 days of the Logan Southern R. R. from Omar to Sterrett, a distance of ten miles, the Main Island company having changed the name of Crane to Sterrett when many improvements were started there with a view to making it one of the large plants of the company. The holdings include a large acreage of coal of excellent quality which it is proposed to mine on an extensive scale. There has been a large influx of miners since improvements were initiated, and when the new road permits the shipment of even more coal Sterrett will become one of the most important shipping points in the Logan field.

INDIANA

Jacksonville—The supply house and blacksmith shop at the Green Valley mine has been burned with loss of \$2000, covered by insurance.

ILLINOIS

Nilwood—The Union Fuel Co. has purchased the mine of the Nilwood Mining Co. for \$350,000.

Marion—The Peabody Coal Co. is installing at its No. 3 mine at Marion a large crusher which was made by the Link-Belt Co., of Chicago. The crusher has a capacity of 2500 tons per day and will produce a product of 1½-in. cubes of coal.

Du Quoin—Drilling has been started on the Wabash, Chester & Western R. R., ten miles west of here, on 7000 acres of land which have been leased by Crawford & Hagler. It is reported that results of the drilling indicate that a large mine will be sunk near the location soon.

Du Quoin—At a recent election among the miners of the Ninth Subdistrict, which embraces all of Franklin County, the proposition to continue the payment of \$750 death fund was defeated. The per capita assessment on the miners was unusually heavy during the recent influenza epidemic, and in addition to this a number of deaths resulted from the Royalton mine explosion

last year. The treasurer of this subdistrict, which is the largest subdistrict in the State of Illinois, during the epidemic period paid out \$22,500 in claims, with additional claims for \$68,000 pending adjustment.

KENTUCKY

Whitesburg—The Wells Coal Co. has recently completed negotiations for the acquirement of the plants of the Salt Lick Coal Co. and the Black Diamond-Elkhorn Coal Co., located in the vicinity of Right Ford of Beaver Creek. It is understood that plans are now being arranged for extensive development operations. The company has also leased additional coal properties in this section, which will also be developed.

ARKANSAS

Clarksville—The King & Johnson Mining Co., of Montana, is understood to have completed arrangements for extensive improvements and extensions in its local coal-mining properties. The plans include the erection of a new coal tippie, electrically operated, with the installation of electric motors and auxiliary apparatus, and the construction of a five-mile railroad branch. The work will involve an expenditure of approximately \$150,000.

OKLAHOMA

Tulsa—The B. B. Coal Co. has opened a mine on its holdings just east of Tulsa. This company owns 125 acres underlaid with a vein of coal several feet in thickness and at such shallow depth to permit of profitable working.

Tulsa—Charles Page, oil magnate of this place, has purchased 1000 acres of proven coal lands southwest of here which he will soon begin developing. Mr. Page will build a line of railroad into the heart of this tract to handle the coal mined.

Dawson—Cosden & Co., oil producers, have purchased extensive coal lands at Dawson, four miles east of Tulsa, and will begin taking coal from new mines that will be opened there during the summer. Cosden & Co. own and operate at Tulsa an oil refinery said to be the largest in the world. Since the supply of natural gas in the Oklahoma fields is proving inadequate and is insufficient to operate the refinery, Cosden & Co. are looking elsewhere for fuel. It is the plan to take coal from the recently acquired coal lands for operating the Tulsa refinery.

KANSAS

Pittsburg—Daylight saving to economize on the use of fuel has worked the other way in the Kansas coal fields, so far. Twenty-six coal mines in this district were idle last week because the men would not go to work earlier, and the companies persisted in following the Government time change. An agreement has been reached, however, whereby the men will resume their work on the new time schedule pending a rearrangement of car schedules by the railroads.

NEW MEXICO

Oscura—The Consumers Coal Co. is being organized at El Paso, Tex., by M. D. Gaylord, an experienced coal operator, for the purpose of developing four sections of coal lands in the vicinity of Oscura. The company plans to bring the daily output of the property to 500 tons. The El Paso & Southwestern Ry. runs through the property, which is 128 miles from El Paso.

Foreign News

Victoria, B. C.—Consumers of coal here have now to pay \$10.25 a ton and, if they buy it in half-ton lots, at the rate of \$10.50 a ton. Shortly before the war the price in this and neighboring cities was \$6.50 a ton, which furnishes a good illustration of the remarkable advance which has taken place within a comparatively brief period. The dealers' only explanation is that, as domestic coal has been selling at a lower figure than bunker coal, and as for some reason the sale of bunker coal has fallen off, the mine operators have been obliged to bring the price of domestic coal near the mark of that being sold at the bunkers in order to pay the miners the present high wage scale. They could not explain how it happens that bunker sales have declined, although venturing the suggestion that fuel oil now is being used by many more vessels than in the past.

Toronto, Ont.—The annual meeting of the Canadian Associated Coal Dealers was held here on Apr. 3. The situation was fully discussed, the general consensus of opinion being that there was still a possible

danger of temporary shortage in case of a sudden rush of orders, but that this would be averted if consumers would order supplies early. Some advance in prices was regarded as certain. The following officers were elected: T. A. Harrison, Toronto, president; J. M. Daly, London, vice president; B. A. Caspell, Toronto, secretary-treasurer; M. F. Craig, Guelph; J. A. Maclean, Wingham; J. F. Foulds, Campbellford; G. M. Baker, Lindsay; Edward Browne, Port Hope; G. A. Stanley, Lucan, and G. F. Rogers, St. Catharines, directors. Resolutions were adopted that the Railway Commissioners be requested to give consideration to the inconveniences suffered by coal dealers and attempt to adjust their grievances in a definite period; that the government be urged to continue the office of Fuel Controller in the interests of the public, and that the dealers watch carefully for impurities in coal and demand compensation from shippers, and that the government fix the amount of impurities possible.

Nanaimo, B. C.—There has been litigation during the past few weeks over title to the coal fields of Vancouver Island controlled by the Nanoose Collieries, Ltd., suit being brought against the company by A. F. Eastman, manager of the Marble Bay mines, Texada Island, for an accounting and for an order restraining further work on the property. His claim was that in 1906 he had entered into an agreement with the then owner of a portion of the property now under development to provide money for opening up the coal measures supposed to be there in return for a half interest. Work started on this basis, a small seam was struck not far from the surface, and then a disagreement arose with the result that operations were suspended. Mr. Jack subsequently died. His executors, according to Mr. Eastman, declared that the estate would sell its interest for \$60,000, whereupon Mr. Eastman et al arranged to dispose of the entire holdings to Alvo von Alvensleben, the German financier and propagandist, of whom considerable has been heard both in Canada and the United States of late years, for \$125,000. This, however, was not accepted by the executors, and Alvensleben bought the Jingle Pot mine, near Nanaimo, B. C. Finally the property was sold out to the Nanoose Collieries, Ltd. The reply to Mr. Eastman on behalf of the company was that his arrangement with Mr. Jack was to the effect that he should have one-half of the returns of coal produced during the active operation of the partnership. The court upheld the company and the action was dismissed.

Personals

W. C. Gartley, formerly with the H. C. Frick Coke Co., at Maxwell, Penn., has accepted a position as superintendent with the Maple Glen Coal works at Shoring, Penn.

J. A. Bier has resigned as superintendent of the Williams Run Coal Co. and Anita Coal Mining Co., Punxsutawney, Penn., and is now connected with the Hurlburt Grease and Oil Co.

Joseph Maize, of Wendel, Westmoreland County, Pennsylvania, has resigned his position as superintendent of Edna Nos. 1 and 2 mines of the United Coal Corporation, effective Apr. 16.

B. H. Armstrong recently assumed the duties of superintendent for the Citizens' Coal Mining Co., of Lincoln, Ill., succeeding William D. Obcamp, who was formerly superintendent of the Lincoln mine.

Robert Whitehead, well known in southern Illinois coal-trade circles, has joined the sales force of the New Kentucky Coal Co., 1700 Fisher Building, Chicago, of which H. L. Keifein recently became vice president and manager.

Henry Blackledge, formerly with the Pittsburgh Coal Co., in Washington County, has been appointed superintendent of Mines Nos. 88, 89 and 90 of the Consolidation Coal Co., with headquarters at Wyatt, W. Va. He succeeds W. E. Lakin, resigned.

A. T. Pace has been reappointed as traveling auditor for the United Mine Workers of America in the 12th district, by President Frank J. Hayes, of Indianapolis, Ind. His territory is in southern Illinois and includes Williamson, Franklin, Saline, White and Gallatin Counties.

J. D. Mooney, recently discharged from the Army after having served overseas as a captain with the 309th Ammunition Train, 84th Division, is now with the General Motors Corporation, New York. Mr. Mooney was manager of the Hyatt Roller Bearing Co.'s industrial division prior to joining the army in 1917.

R. W. Belcher, who has been identified with civil service work, has been elected secretary of the War Service Executive Committee of the Chamber of Commerce of the United States to take up the work inaugurated by W. H. Manss at the great reconstruction conference of American business, held at Atlantic City last September.

T. L. Cole, formerly assistant in the sales department of the New York Coal Co., Columbus, Ohio, has resigned to take a position with the Kendall Coal Co. **C. C. Everhart**, who was the Detroit representative of the New York Coal Co., has resigned his position, being succeeded by **John F. Nuebach**, formerly with the Semet Solvay Co. **C. C. Everhart** has gone into the jobbing business in Detroit.

James D. Monie has resigned as chief clerk of the New York office of the Tidewater Coal Exchange and on Apr. 15 became New York sales manager of the Johnstown Coal and Coke Co. Mr. Monie has been with the Tidewater Coal Exchange since its organization. The office of the Johnstown Coal and Coke Co. will be removed from the Park Row Building to the Maritime Exchange Building, 80 Broad Street.

W. H. Ashlers has been made assistant secretary and treasurer of the Rackett Brook Coal Co., Carbondale, Penn., and **Edward B. Burr** has been appointed general superintendent of operations. The former takes a newly created position and the latter the place of **E. H. Leaning**, who has had charge of operations for the past three years. Mr. Leaning is still identified with the Nay Aug Coal Co. and will probably devote his entire time to the operations of that company.

Obituary

William Clayton, pioneer operator and one of the first to sink a mine in the Standard field of Illinois, died recently at his home in Collinsville. He sank two mines near Collinsville 35 years ago and afterward sold them to the Consolidated Coal Co., of St. Louis.

Harvey Miller, 40 years of age, a prominent coal and lumber man of eastern Kentucky, recently died at his home near Whitesburg, Ky., of influenza. Mr. Miller held title to several fine coal properties and had a number of hardwood tracts, operating several mills.

D. E. Adams, a leading coal merchant of Winnipeg, Man., and a pioneer of the business in Western Canada, died on Apr. 3 at Pasadena, Cal., where he had been spending the winter on account of ill health. He came to Winnipeg from Toronto in 1882 and entered the coal business as representative of the North West Fuel Co., of St. Paul, Minn., which was the only concern engaged in the Winnipeg trade at that time. It afterward sold out to the Dominion Coal Co., of which Mr. Adams was manager from 1885 to 1895. He was also connected with the company that was the first to mine Souris Valley coal. In 1904 he became secretary and selling agent of the Tabor Coal Mining Co., which afterward sold out to St. Paul and Minneapolis capitalists who organized the Canada West Coal and Coke Co. Mr. Adams' business was transferred to a joint stock company under the style of the D. E. Adams Coal Co., Ltd. Mr. Adams took a prominent part in the business and social life of Winnipeg and was a Free Mason. He leaves a widow, one son and two daughters.

Coming Meetings

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, L. L. Runyan, Chicago, Ill.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Retail Coal Dealers' Association of Texas will hold its annual meeting on May 19 and 20 at Fort Worth, Texas. Secretary, C. R. Goldman, Dallas, Texas.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind., subject to ratification of executive committee. Secretary, J. W. Paul, Pittsburgh, Penn.

American Manufacturers' Export Association will tender a luncheon at 12:30 p.m. to all its members who may be in attendance at the National Foreign Trade Convention in Chicago, Apr. 25 to 26, at the Congress Hotel.

Kentucky Mining Institute after having skipped two years, one on account of the war and the other due to the influenza epidemic, expects to hold its annual meeting this year. While the date and place of meeting have not definitely been set, it will probably be held on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

Publications Received

Boiler Water Treatment. Department of the Interior, Bureau of Mines. Technical Paper 218. Unillustrated, 8 pp., 5 1/2 x 9 1/2 inches.

Annual Report on the Mines, 1918. Province of Nova Scotia, Department of Public Works and Mines. Unillustrated, 76 pp., 6 1/2 x 9 1/2 inches.

Eighth Biennial Report of the State Engineer to the Governor of North Dakota for the Biennial Period Ending June 30, 1918. Public Document No. 26. Unillustrated, 174 pp., 6 x 9 inches.

Geology of the Lost Creek Coal Field, Morgan County, Utah. By Frank R. Clark. Department of the Interior, United States Geological Survey. Bulletin 691-L. Illustrated, pp. 311-322, 6 x 9 inches.

A Summary of Mining in the State of Washington. By Arthur Homer Fischer. Bulletin No. 4. Engineering Experiment Station, University of Washington. Unillustrated, pp. 124, 6 x 9 inches.

Method of Least Squares Applied to Estimating Errors in Coal Analysis. By J. D. Davis and J. G. Fairchild. Department of the Interior, Bureau of Mines. Technical Paper 171. Illustrated, pp. 36, 6 x 9 inches.

Combustion Experiments with North Dakota Lignite. By Henry Kreisinger, C. E. Augustine and W. C. Harpster. Department of Interior, Bureau of Mines. Technical Paper 207. Illustrated; 41 pp.; 6 x 9 inches.

Notes on the Geology of the Murchison District. By J. Henderson, Mining Geologist, Geological Survey Department. Pp. 108 to 112 inclusive of the New Zealand Journal of Science and Technology, March, 1918. Unillustrated, 6 1/2 x 9 1/2 inches.

Notes on the Geology of the Waikato Valley near Maungatautari. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 56 to 60 inclusive of the New Zealand Journal of Science and Technology, January, 1918. Unillustrated, 6 1/2 x 9 1/2 inches.

The Geology of the Te Kuiti District, with Special Reference to Coal Prospects. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 112 to 115 inclusive of the New Zealand Journal of Science and Technology, March, 1918. Unillustrated, 6 1/2 x 9 1/2 inches.

Notes on the Geology and Mineral Occurrences of the Wakamarina Valley. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 11 to 15 inclusive of the New Zealand Journal of Science and Technology, January, 1918. Unillustrated, 6 1/2 x 9 1/2 inches.

A Preliminary Report on the Mining Districts of Idaho. By Thomas Varley, Clarence A. Wright, Edgar K. Soper and Douglas C. Livingston. (In cooperation with the University of Idaho.) Department of the Interior, Bureau of Mines. Bulletin 166. Illustrated, 103 pp., 5 1/2 x 9 1/2 inches.

Trade Catalogs

Locomotive Coaling Plants. Roberts & Schaefer Co., Chicago, Ill. Bulletin No. 34. Pp. 68, 9 x 11 1/2 in., illustrated. Typical coal handling plants designed and built by the company.

Boiler Logic. Heine Safety Boiler Co., St. Louis, Mo. Catalog. Pp. 86, 6 x 9 in., illustrated. A treatise on steam boilers, accompanied by a supplement in color of a Heine boiler set over an underfeed stoker.

Use and Abuse of Electric Headlights on Mining Locomotives. Ohio Brass Co., Mansfield, Ohio. Pp. 15, 8 x 10 1/2 in., illustrated. Reprint of a paper read by K. W. Mackall before the Coal Mining Institute of America.

Modern Types of Flory Mine Hoists. S. Flory Manufacturing Co., Bangor, Penn. Catalog 26. Pp. 6 1/2 x 9 in., illustrated. Taken bodily from the company's general catalog and covers a general line of mining hoists.

Type "C" Roller Bearings. American Roller Bearing Co., Pittsburgh, Penn. Bulletin No. 1004. Pp. 8, 6 1/2 x 10 in., illustrated. These roller bearings are recommended for use under conditions of medium loads at medium speeds.

Fairmont Coal Augers. Fairmont Mining Machinery Co., Fairmont, W. Va. Bulletin No. 15. Pp. 4, 6 x 9 in., illustrated. Describes a power auger for use in coal 5 ft. thick and over. Emphasis is placed on flexibility and easy portability.

Sullivan "WB-3" Air Compressors. Sullivan Machinery Co., Chicago, Ill. Bulletin 75-E. Pp. 12, 6x9 in., illustrated. Compressors for general mining, quarrying or contracting work, and to operate coal machines, drills, pumps and pneumatic tools.

"Sergeant" Ticket Cancelling Box. Ingersoll-Rand Co., New York, N. Y. Form No. 9010. Pp. 4, 6 x 9 in., illustrated. Used at ball grounds, moving picture theaters, etc., where great quantities of tickets must be disposed of without the possibility of their ever being used again.

Recent Coal and Coke Patents

Mine Apparatus. A. Bucey, Bowerstown, Ohio, 1,294,868. Feb. 18, 1919. Filed May 14, 1918. Serial No. 234,462.

Steel Framing for Mine Shafts. O. D. McClure, Ishpeming, Mich., 1,294,814. Feb. 18, 1919. Serial No. 128,418.

Sifter Grate. G. G. Bole, Union City, Mich., 1,293,677. Feb. 11, 1919. Filed June 6, 1918. Serial No. 238,543.

Ash Sifter. S. Heath, Philadelphia, Penn., 1,294,262. Feb. 11, 1919. Filed Dec. 13, 1918. Serial No. 266,605.

Ash Cart Cover. S. Rochlis, Philadelphia, Penn., 1,294,708. Feb. 18, 1919. Filed Aug. 23, 1917. Serial No. 187,770.

Breast Car for Mines. R. Christiansen, Black Diamond, Wash., 1,294,619. Feb. 18, 1919. Filed Aug. 17, 1918. Serial No. 250,394.

Coal Pile. A. C. Johnston, assignor to Link-Belt Co., Chicago, Ill., 1,256,569. Feb. 25, 1919. Filed Dec. 14, 1918. Serial No. 138,184.

Registering Device for Automatic Stokers. H. J. Petersen, Minneapolis, Minn., 1,294,700. Feb. 18, 1919. Filed May 7, 1918. Serial No. 233,010.

Coal Loading Machine Gathering Mechanism. J. F. Joy, N. Belle Vernon, Penn., 1,295,173. Feb. 25, 1919. Filed May 9, 1918. Serial No. 233,477.

Boiler Furnace. W. J. Manhire, assignor to Combustion Specialty Co., Kansas City, Mo., 1,293,845. Feb. 11, 1919. Filed June 1, 1917. Serial No. 172,826.

Coal Reducing Apparatus. H. Adams, assignor to Adams Mining Machinery Corporation, New London, Conn., 1,293,656. Feb. 11, 1919. Filed Sept. 20, 1915. Serial No. 51,563.

Pneumatic System for Cleaning Coal. L. B. Yeiser, assignor to Glauber Brass Manufacturing Co., Cleveland, Ohio, 1,295,250. Feb. 25, 1919. Filed Aug. 16, 1917. Serial No. 186,468.

Process and Apparatus for Reducing Coal. H. Adams, assignor to Adams Mining Machinery Corporation, New London, Conn., 1,293,654. Feb. 11, 1919. Filed Aug. 24, 1915. Serial No. 47,064.

Industrial News

Middletown, Ohio—Papers have been filed increasing the capital of the Solar Coal Co. from \$100,000 to \$200,000.

Dover, Ohio—The Macksburg Coal Co. has been chartered with a capital of \$100,000 by L. R. Page, Joseph Jenkins, W. H. Scheu, John Rees and Charles A. Graber.

Wheeling, W. Va.—The Echo Coal Co. has recently filed notice of an increase in its capital from \$50,000 to \$150,000, to provide for general business expansion.

Ashland, Ky.—The Lackey Mining Co. has filed notice with the Secretary of State of an increase in its capitalization from \$12,000 to \$50,000, to provide for expansion.

Moundsville, W. Va.—Plans are under consideration by the Mound City Coal Co. for the immediate rebuilding of its tippie recently destroyed by fire, with loss of about \$10,000.

Johnstown, Penn.—The Sheesley Coal Co. has filed articles of incorporation with a capital of \$50,000 to operate in the Johnstown section. J. D. Sheesley is the principal incorporator.

El Paso, Tex.—The Hines Lumber and Coal Co. has filed notice with the Secretary of State of an increase in its capitalization from \$20,000 to \$100,000, to provide for general business expansion.

Whitesburg, Ky.—Fess Whitaker and associates have completed negotiations for the leasing of extensive coal properties in the Whitesburg section, and are arranging plans for early development.

Cleveland, Ohio—The Guernsey Land, Timber and Coal Co. has been chartered with a capital of \$100,000 by Mark A. Copeland, F. B. Everts, James F. Walsh, K. Droegge and O. E. Schulte.

Whitwell, Tenn.—The Whitwell Coal Co. has filed notice with the Secretary of State of an increase in its capital stock from \$50,000 to \$100,000. The increase will be used, it is understood, for general business expansion.

Zanesville, Ohio—Papers have been filed with the secretary of state increasing the capital of the Kehota Coal Co. from \$1,000,000 to \$2,000,000. The increase will be used in the expansion of the operations in this neighborhood.

Marion, Ky.—The Lagrauge Mining Co. has been incorporated with a capital of \$30,000 to engage in the development of coal properties in the Marion section. J. L. Lane, A. S. Furtwangler and W. A. Barton are the incorporators.

Charleston, W. Va.—The Nelson Coal and Oil Co. has filed articles of incorporation with a capital of \$150,000 to operate in the Charleston district. C. W. Morton, Charles E. Krebs and E. M. Johnson are the principal incorporators.

Whitesburg, Ky.—The Southeast Coal Co., Seco and LeViers, Ky., is understood to be considering plans for the installation of new coal-mining machinery for the development of coal properties in the Thornton Creek section, near Whitesburg.

Harriman, Tenn.—The Harriman Coal & Land Co. has been incorporated with a capital of \$40,000 to engage in coal-mining operations in the vicinity of Harriman. Brown Crinkley, L. O. Scott and G. W. Chandler are the principal incorporators.

East Burnstadt, Ky.—The Furnie Coal Co. has been incorporated with a capital of \$10,000 to engage in the development of coal properties in the vicinity of East Burnstadt. T. S. Lanier, Sr., Richard Gentry and C. W. Nelch are the principal incorporators.

Columbus, Ohio—The Central West Coal and Lumber Co., of Columbus, has increased its authorized capital from \$100,000 to \$250,000, in order to acquire additional mining property in the Hocking Valley and Pomeroy Bend fields. J. S. McVey is president.

Whitesburg, Ky.—The Wells-Elkhorn Coal Co., recently incorporated by A. M. Kelly, J. S. Fitzgerald and L. S. Wilson, has filed notice with the Secretary of State of an increase in its capitalization from \$75,000 to \$300,000 to provide for general business expansion.

Little Rock, Ark.—The North Spadra Coal Co. has filed articles of incorporation with a capital of \$25,000 to engage in general coal-mining operations in the Little Rock district. W. R. Eustice is president. L. Werner is vice president and P. D. McKinnon is secretary-treasurer.

Chicago, Ill.—The Chicago Pneumatic Tool Co. has moved its Milwaukee office

from Room 1305, Majestic Building, to Room 1418 in the same building, where more convenient quarters necessitated by the growing business of the company in this district have been obtained.

New York, N. Y.—The A. P. Green Fire Brick Co., of Mexico, Mo., has opened an eastern district sales office in New York City at 30 Church St. Howard C. Thayer, formerly field mechanical engineer for the J. G. White Engineering Corporation at U. S. Nitrate Plant No. 2, is in charge.

Buffalo, N. Y.—Weston & Dodson, coal miners and shippers at Bethlehem, Penn., will locate a branch office here under the management of H. J. Welch, formerly with the Philadelphia & Reading Coal and Iron Co. here. Better control of the firm's Canadian trade is the principal object.

Buffalo, N. Y.—The Penn Canadian Fuel Co. has been organized with principal office in Toronto. B. M. Bremner, of that city, will be managing director. Members of the Weaver Coal Co., of Buffalo, are largely interested in the new organization. A general rail and water coal business will be done.

Columbus, Ohio—The Ohio Board of Administration will soon place contracts for approximately 20,000 tons of Hocking mine-run to be used at the various institutions of the state for the remainder of the fiscal year up to July 1. The H. W. Jenkins Coal Co. was the low bidder at \$1.75 at the mines.

Charleston, W. Va.—J. M. Magee and other business men of Pittsburgh have organized the Allegheny Western Mining Co. with an authorized capital of \$100,000 to engage in the mining business. The incorporators are J. M. Magee, A. G. Wells, A. B. Coleman, W. St. Clair Childs and Simon Patterson, all of Pittsburgh.

Webster Springs, W. Va.—The Webster Smokeless Coal Co. has filed articles of incorporation with a capital of \$150,000 to engage in the development of coal properties in the Webster Springs district. L. C. Anderson, Welch, W. V.; J. E. Anderson, Cowen, W. Va.; and E. H. Morton, Webster Springs, are the incorporators.

Zanesville, Ohio—The authorized capital of the Kehota Mining Co. has been increased from \$1,000,000 to \$2,000,000. The concern has developed several large striping operations and holds other lands to be developed later. The sales end of the business is carried on by the Pittsburgh & Bessemer Coal Co., of Columbus.

Buffalo, N. Y.—The Peabody Coal Co., of Chicago, has taken offices in the Marine Bank Building and placed them in charge of H. P. McCue, for some time located in Pittsburgh as the assistant fuel controller of Canada. The plan is to concentrate the Canadian trade in the one office, both with Pennsylvania and western mines.

Huntington, W. Va.—Huntington citizens are planning for the development of coal lands near Pikeville, in Pike County, Kentucky, and have organized the Pike Coal Co. with an authorized capital of \$10,000. The incorporators of the new company are G. W. Pyle, B. N. Pyle, H. C. Simpson, J. F. Vass, E. I. Hofmner, all of Huntington.

New York, N. Y.—During the year ended Dec. 31, 1918, the New York, New Haven & Hartford R. R. carried over its lines 4,030,863 tons of anthracite coal, an increase of 784,520 tons over the previous year; 5,707,299 tons of bituminous, an increase of 1,130,693 tons over the previous year, and 218,057 tons of coke, an increase of 64,525 tons over the previous year.

Gadsden, Ala.—The Blount Mountain Coal and Iron Co. has been incorporated with a capital of \$2,000,000 by Chicago interests. It is understood that plans are now in process of formation for the development of a tract comprising approximately 30,000 acres of coal and iron properties in the vicinity of Gadsden. J. J. Burns is president; F. W. Rehbock, vice-president, and A. Fink, secretary-treasurer, all of Chicago, Ill.

Birmingham, Ala.—It is reported that the properties of the Warrior-Pratt Coal Co., at Porter, in the western part of Jefferson County, have been leased to the Sheffield Company, with furnaces located at Sheffield, Ala., and large ore mines in the Russellville district. The company also has beehive coke ovens in Walker County not far distant from the leased properties, which will be available for coking the output of the mines.

Columbus, Ohio—City Purchasing Agent Guthke opened bids Apr. 7 for approximately 7000 tons of nut, pea and slack for the garbage and refuse plants, the municipal light plant and the waterworks department. The Maynard Coal Co. bid \$1.53 for

Pomeroy Bend coal, guaranteeing 12,200 B.t.u. and taking a discount or premium as the case may be. The contract was awarded to the Maynard Coal Co. The Fletcher-Williams Coal Co. bid \$1.44 for Hocking nut, pea and slack.

Louisville, Ky.—A license ordinance recently introduced before the City Council, and which would have taxed all coal brokers, retailers, salesmen, etc., the retailers paying on the basis of volume done per year, was killed in the city council last week, a substitute ordinance being introduced which left the coal men out. This ordinance was framed for the purpose of raising revenue sufficient to meet the loss that will result in city revenue from national prohibition.

Buffalo, N. Y.—The Buffalo office of the Century Coal and Coke Co., of Montreal, announces the consolidation of that company with four Canadian companies—the Quebec Coal and Dock Co., the Toronto Coal and Dock Co., the Port Colborne Coal and Dock Co. and the Northern Dock and Coal Co., of Sault Ste. Marie, Ont.—with capital of \$2,500,000, under the name of the Century Coal Co., Ltd. The principal office will be in Montreal as formerly. The leading organizers were Fred McCourt, Dr. W. L. McDougald and Harry F. Butler, of the Century company.

New York, N. Y.—The Railway and Power Equipment Co., Woolworth Building, New York, is planning increased scope of operation. With this in mind it has been incorporated in Delaware with a capital stock of \$5,000,000, \$3,000,000 common, \$2,000,000 7 per cent. cumulative preferred. In addition to the interests of Charles F. Johnson, who has been carrying on the business for about 20 years, it has taken in other interests. Its new work is planned to include engineering and equipment work in any way connected with power, railroads, industrial establishments and contracting in all parts of the world.

St. Louis, Mo.—Because of the unusual heavy coal-shipping conditions which have developed on the Illinois Central R. R. between southern Illinois coal fields and St. Louis, that company has constructed a four-mile double-track extension on this division between Belleville and Wilderman. It is estimated that at least 90 per cent. of southern Illinois coal which is billed to St. Louis is routed over this division.

An organization has been perfected in Franklin County to be known as the Franklin County Mine Examiners' Safety First Association, the object of which is to better mining conditions and urge safety first measures in mining. Resolutions dealing with mining methods were drafted and will be presented to the State Department of Mines and Minerals.

Chicago, Ill.—The American Steam Conveyor Corporation announces the appointment of Charles H. Florandin, formerly of the National Electric and Welding Co., New York, as general manager of its eastern territory with headquarters at the New York office, 110 West 40th St. Mr. Florandin, who assumes charge of his new duties May 1, was born in France and received his technical education at the famous Lycee de Marseilles. He is an engineer by profession and upon coming to the United States did important work with the Brooklyn City Railway Co. in the early days when the road was being electrified. After five years' service with this company, he joined the C & C Electric Co., New York, where he held a responsible position with them for many years.

New York, N. Y.—The Railway and Power Equipment Co., Woolworth Building, New York, has received an inquiry from Belgium for \$200,000 worth of machine tools, including lathes, planers, shapers, turning and boring machines, slotters, radial drills, steam hammers, shears, punches and shears, machinery for manufacturing springs, four 16-ton traveling cranes. It also has the following inquiries: 120,000 tons new steel rails for a French colony; five tons of portable track for France; electric power and lighting machinery for Japan; slotters, hammers, presses, cranes, locomotives, for Bombay, India; railway, mining, sugar plantation and factory equipment for Panama; air compressors for Chile; derricks and electrical machinery for Hong Kong, China; contractors' supplies, machinery and equipment for France; machine tools and hammers for England; railroad equipment for Spain; machinery and tools for Antofagasta, South America; a large quantity of electric motors for Bombay, India; machinery and tools for Brazil; railway equipment and machinery for Argentina; three new steam locomotives for Japan; forty pairs of steel car trucks for electric railways for Italy.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Slight Improvement in Bituminous—Production Still Dropping—Better Buying Demand Looked For—Anthracite Situation Is Decidedly Better—Small Sizes Scarce and Prices Being Maintained at Former Levels

ALL things considered, the bituminous coal market shows an improvement over the previous week. Conditions are far from satisfactory, however, the general lack of interest on the part of buyers being still in evidence. The soft-coal mines continue to work on a restricted basis, and the output from the respective operations is merely sufficient to meet the orders on hand. During the week ended Apr. 5 the bituminous mines of the country produced 7,005,000 net tons of coal, which is 455,000 net tons below the production for the week ended Mar. 29 and 2,280,000 net tons below the output for the week of Apr. 6, 1918. Little progress has been made dur-

ing the past week in the railroad fuel controversy. It has been announced that the railroad employees are to receive another increase in wages. As practically all the roads are short of funds, this added financial burden will undoubtedly lead to a substantial increase in freight rates. The coal industry is anticipating a stronger market from now on, as many consumers will purchase their coal before the proposed advances go into effect. Quite an active demand is evident for the higher grades of soft coal and prices are being maintained at or near the former Government maximums.

There is a decidedly encouraging improvement in the anthracite situation.

Demand has become stronger, and all branches of the industry appear to be busier than they have been for some time. Shipments of anthracite to New England have become stronger as the result of a reduction in waterborne freight rates. Pea coal and the smaller sizes are in much better demand. All of these coals are tightening, and quotations that were being shaded are nearly back to normal.

The output of anthracite during the week ended Apr. 5 is estimated at 1,272,000 net tons, approximately 160,000 net tons below the output recorded during the week preceding and 600,000 net tons lower than the production of the week of Apr. 6, 1918.

WEEKLY COAL PRODUCTION

The observance of Apr. 1 as a miners' holiday tended still further to reduce production of bituminous coal during the week ended Apr. 5, the output being estimated at 7,005,000 net tons. This production is 455,000 net tons below the output the week of Mar. 29 and 2,280,000 net tons below the production for the week of Apr. 6, 1918. The daily average production during the week ended Apr. 5 is estimated at 1,167,000 net tons as compared with 1,382,000 net tons for the calendar year to date, and 1,763,000 net tons for the same period of last year. Estimates for the calendar year to date place the output at 113,329,000 net tons as compared with 144,591,000 net tons for the period Jan. 1 to Apr. 6, 1918.

Production of anthracite in the United States during the week ended Apr. 5 is estimated at 1,272,000 net tons, and is approximately 160,000 net tons below the output recorded during the week preceding. Compared with the corresponding week of last year the current weekly output falls approximately 600,000 tons. The total production of anthracite for the period Jan. 1 to Apr. 5 is estimated at 18,943,000 net tons, as compared with 25,563,000 net tons during the same period of 1918. The daily average for this calendar year to date is 231,000 net tons and falls 81,000 net tons below the daily average of last year, estimated at 312,000 net tons.

The carriers' reports for the week ended Apr. 5 show a decrease in loading in all fields with the exception of western Pennsylvania and the southern West Virginia fields. Decreases which occurred in other fields, with the exception of Ohio and the district including Illinois, Indiana and western Kentucky, were slight, while the decreases in the two fields mentioned were large.

Shipment of bituminous coal from the tidewater harbors to all points during the week ended Apr. 5 is estimated at 470,729 net tons, and while in excess of the tonnage moved during the week ended Mar. 29, estimated at 402,126 net tons, falls considerably behind the movement during the corresponding week of 1918, when the tonnage equaled 698,930 net tons. Improvement in the current week's shipments over the week preceding occurred at all harbors—New York making the greatest gain.

Shipments to New England by tidewater during the week ended Apr. 5 are estimated at 120,162 net tons as compared with 89,166 net tons during the week of Mar. 29. The current week's shipments, however, fall approximately 110,000 net tons below that for the week of Apr. 6, 1918, estimated at 229,278 net tons. Shipments

to New England by rail during the current week were not reported.

The production of beehive coke in the United States during the week ended Apr. 5 is estimated at 369,807 net tons as compared with 362,283 net tons during the week preceding and 568,651 net tons during the corresponding week of 1918. During the current week considerable increase occurred in Colorado, Oklahoma and New Mexico compared with the week ended Mar. 29, and is approximately the same as produced in these states during the week ended Apr. 6, 1918. In all other states production was considerably lower than that reported during the corresponding week of last year. The daily average per working day during the week ended Apr. 5 is estimated at 61,635 net tons, as against 77,392 net tons, daily average for the year to date, and 93,547 net tons for the same period for 1918. The total production for the period Jan. 1 to Apr. 6 for this year is estimated at 6,346,135 net tons, and falls approximately one and one-quarter million net tons below the output of last year.

BUSINESS OPINIONS

The Iron Age—The price-fixing wrangle at Washington has halted business in iron and steel. While ostensibly some development from the repeated conferences between the heads of the Industrial Board and the Railroad Administration is awaited, the belief is widespread that confidence in co-operative price maintenance has been shattered. Pig-iron output was 3,090,243 gross tons in March, or 99,685 tons a day, against 2,940,168 tons in February, or 105,006 tons a day. Furnaces active on April 1 were capable of producing 93,165 tons a day, against 101,475 tons a day as the rated capacity active on March 1. Since Dec. 1, 94 furnaces have been blown out.

American Wool and Cotton Reporter—Government auctions and the prospects of the domestic clip are prominent features in the Boston wool market. There is also considerable interest in the London sales. It is expected that at the auctions this week prices will be stronger than ever before. News of the good prices paid at the London sales for wools have had a very strengthening effect on the wool trade in this country. A little more inquiry has been in evidence in the cotton market during the week under review, but actual business with the mills has not increased materially.

Bradstreet's—Ordinary distributive trade stimulated by spring influences, perfect winter wheat crop conditions, extraordinary prices present and prospective for farm

produce, past excellent industrial and agricultural earnings and the return of hundreds of thousands of soldiers to private life with money in their pockets, shows further expansion, despite inclement weather and bad roads in some sections. Buying from wholesalers for fall is rather more confident and while there are evidences of conservatism due to price reduction talk the reductions so far made are not up to expectations. As for some time past consumptive demand seems to single out lines which have been under the ban of war necessity.

Dry Goods Economist—The call for merchandise is perhaps more insistent in connection with goods whereof the production period is close to that of consumption, such as women's, misses' and children's wear, dress accessories, fancy goods, notions, etc. Nevertheless, in all of the piece goods lines there are evidences of an increased willingness to operate on the part of buyers, due, no doubt, to the reductions in price which have taken place. Raw materials also continue high, cotton in particular having advanced 200 points during the last two weeks. At Government auctions the better grades of wool have brought prices well above the Government's minimum figure.

Marshall Field & Co.—Current wholesale distribution of dry goods is nearly up to the large volume of the corresponding week of 1918. Retail business continues excellent and a great many more merchants were in the market. Road sales for immediate delivery were larger, compared with the same period last year. Orders for fall delivery are being placed in excellent volume, which indicates that merchants now have confidence in the stability of prices named for fall merchandise. Collections were normal.

Atlantic Seaboard

BOSTON

Shippers still short of orders for April and May. Only scattering sales. Higher grades firm all-rail. Railroad fuel still a storm center. A depressing factor in prices of higher volatiles. Light production and conservative selling characteristic of central Pennsylvania. Hampton Roads tonnage very light. Shipping Board rates reduced. Delivered prices named. Large buyers tempering the market. Flirting with oil. Anthracite shipments slow starting. Sundry difficulties. Demand increasing. Retail deliveries show marked improvement.

Bituminous—The market here continues without material change. There is the same dullness and the same general lack of interest on the part of buyers that has been usual for the past six weeks. Through the lack of orders for spot shipment most of the operators are getting out about 50 per cent. of the usual tonnage, and there is little chance that New England will be the means of boosting this any for some weeks to come. There is a good deal of talk in trade circles about the interruptions that are likely to take place in mining and transportation in the fall and winter, but the mild season we have just gone through and the high water that has helped out so many manufacturers have only served to postpone the time for anything like active buying in this territory. All sections are being carefully combed for orders, but reports agree that for May as well as April there will be only a light business.

A few mill buyers are placing orders for limited tonnages for delivery over a period of five or six months, but in the aggregate the volume is small and is not particularly significant. Aside from the few contracts that continue to be made on specialties, there are only scattering sales. There is more faith in the market than was the case a month ago; there is also less disposition to buy the lower-priced medium grades. There is more and more insistence on coals of recognized value and in another two months it is quite likely these will be well sold up.

Prices on the quality coals are being firmly maintained, especially all-rail, and few concessions are heard. This is the wiser course on the part of selling agents, for not infrequently it happens that the higher price will sell coal when other conditions are not so favorable. The weak spot is in the Fairmont district where the railroads seem to be having pretty much their own way. It is only natural that coals in that region will be the last to react to any improved demand, especially in this territory where consumers are so well stocked that for a long time to come their interest will be only in the low-volatile grades from other districts.

Proposals have been submitted the past week to the New Haven road, and on the 17th inst. bids will be received on locomotive fuel for the Boston & Maine. The latter is not as accessible to the Fairmont district as the New Haven, and for that reason is not likely to buy on quite so low a range of prices. A small block of high volatile from central Pennsylvania was rumored to have been bought by the Boston & Maine for April-May delivery at a price very close to \$2 per net at the mines. Practically every house in the trade has been invited to submit prices for deliveries over any period to Apr. 1, 1920, although no purchase is likely to be made of any save operators, so great is the pressure from Washington to buy only at first-hand. So long as low prices are quoted on railroad fuel there is not likely to be any marked improvement in buying sentiment.

Many of the larger buyers have been accustomed to wait the results of railroad buying, although it is by no means clear this present season whether railroad purchases will be a sufficient guide. One-third of the bituminous that comes here is of course used by the railroads, and a determined effort is being made to arrange for a large portion of their tonnage to come by the all-rail route. Undoubtedly the railroads will have their way, and once their requirements are arranged for there will be some effect on the volume of commercial coal that it is sought also to bring to this market through all-rail channels. Today the Railroad Administration is certainly a depressing factor; it remains to be seen what will be the effect of purchases it is now proposed to make. The trade is following the controversy with much interest, but the opinion seems to be that price-fixing is now out of the question.

So long, however, as operators in Central Pennsylvania adhere to their policy of light production and conservative selling there are likely to be few weak spots among the coals that most steam-users want to buy. On some of the medium coals there are still prices down to \$2.60@2.75 for spot shipment, but there are no sales of any consequence. What market there is seems to show a pronounced tendency toward the higher grades.

Hampton Roads tonnage is also very light. In one day recently there were only five bottoms entered at the piers to load, and practically every agency has heavy accumulations at all the terminals. The export business seems mostly a mirage, unless and until suitable ships are forthcoming at rates that will enable American coals to compete. Aside from the few contracts that shippers have been able to

make this season there is little doing on Pocahontas and New River in New England. The Shipping Board has now reduced rates another 50c. on steamers under its operation, making the new rate from Hampton Roads to Boston \$2, or \$1.75 to Providence. Outside barges are also on a \$2 basis, although there have been rumors of a rate as low as \$1.75, Norfolk to Boston. Even on this latter rate the smokeless coals are likely to be confined pretty closely to an area within a score of miles or so of the tidewater distributing point.

Certain of the rehandling factors here have made a tentative price of \$7.90 per gross ton f.o.b. cars Boston for inland delivery through the year to April next. This makes the cost at Lowell, Mass., for instance, very close to \$9, or nearly \$1.50 per ton more than high-grade Pennsylvania coals at \$3.10 per net ton at the mines. It is doubtful whether the large textiles will make any very comprehensive purchases on the basis referred to. Purchasing agents are tempering the market, and it is still too early to get a line on their probable procedure. Too often have they seen Hampton Roads prices drop between April and July to get much interested in buying at this stage. Then, too, there are several who want to know more about fuel oil. There is every prospect that very large preparations will soon be apparent for handling oil at various points on tidewater.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton, as designated:

	Clearfields	Cambria and Somersets
F.o.b. mines, net tons.....	\$2.15@2.75	\$2.80@3.35
Philadelphia, gross tons.....	4.20@4.90	5.00@5.40
New York, gross tons.....	4.50@5.25	5.35@5.80
Alongside Boston (water coal), gross tons.....	6.10@6.85	6.90@7.65

Georges Creek is quoted at \$3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at \$4.69@5.14 f.o.b. Norfolk and Newport News, Va., for spot coal. Alongside Boston the present gross ton range would be \$7.15@8.10.

Season prices have been made at \$7.90 on cars Boston, for inland delivery.

Anthracite—Somewhat contrary to trade expectation anthracite shipments both all-rail and by water have started very slowly. The mines are now on a full-time basis, but not yet have domestic sizes reached the piers in customary spring volume. Certain sizes are in short supply and the Railroad Administration has further hampered movement by changing instructions as to the type of cars furnished. Port Reading loading is still insisted upon for Philadelphia & Reading railway barges notwithstanding all the delays and hindrances that are plain even to the casual observer. A few barges are loading at Philadelphia, these having come out of the repair yard, and there the customary service is given including the proper screening of the coal. The independent operators are finding it hard to interest retail dealers in their output, for many of the latter have memories of service received in 1917 and 1919.

It is clear, however, that the demand is increasing. Every week that passes without usual spring loadings is just so much handicap on shipments later on. The publicity given to conditions in the anthracite region is causing a much better request from householders, and notwithstanding the present scale of retail prices the dealers in most towns have all the business they can swing with their present stocks and the rate that shipments are now coming forward.

NEW YORK

Anthracite situation shows improvement and dealers look for a brisk spring and summer. Demand is better and consumers show a desire to place orders for immediate delivery. Shipments from local docks delayed by marine strike. Some operators sold up until June 1. More inquiries for bituminous and prospects are encouraging.

Anthracite—Business at this Tidewater market shows a betterment, while reports from inland territory indicate that trade is picking up. There has been an improvement in local conditions which is encouraging. Demand has become stronger and dealers look for an active market as soon as the marine strike is settled. In the meantime all branches of the industry

appear to be busier than they were a couple of weeks back. Consumers are placing their orders with the retailers and the latter, if they have the coal in their yards, are making immediate deliveries. This means additional orders for the wholesale dealer.

The reports from the coal fields show that the operators are looking ahead, as orders have been given in many instances for steadier operation of the mines. Some mine owners have orders ahead to keep them busy for a month, while it is claimed some of the smaller operators have sufficient orders for all sizes to keep their plants going full speed until June 1.

Stocks at the loading piers in this harbor show a steady increase and coal is moving freely notwithstanding the harbor tie-up. Some of the large companies have no difficulty in taking care of their customers, either on water deliveries or by rail.

Canadian dealers are sending many orders and additional inquiries to the local trade, with requests for hurry shipments. Similar indications of an active demand come from the west, where it is said consumers are not taking any chances of being found without sufficient anthracite to see them through next winter. The consensus of opinion among the trade is that for the next several months the industry will be active in all branches.

The improvement in the line trade has been decidedly noticeable. Wholesalers have many orders on their books calling for early delivery. Shipments to New England and to points along Long Island Sound have become stronger because of the reduction in water freight rates by some concerns.

Retail dealers report a much heavier receipt of orders from consumers than has been the rule for the past few weeks, but they attribute a great deal of the rush to the fear of consumers that because of the marine strike it would be wise for them to place their orders now rather than wait until later in the season, when because of the demand all over the country there might be a shortage of coal. It also indicates a desire on the part of the consumers to save the May 1 advance.

Pea coal and the smaller sizes are in much better shape than they were a week ago. All of these coals are tightening and quotations which were being shaded are nearly back to normal.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken.....	\$5.95	\$7.80
Egg.....	5.85	7.70
Stove.....	6.10	7.95
Chestnut.....	6.20	8.05
Pea.....	4.80	6.55
Buckwheat.....	3.40	5.15
Rice.....	2.75	4.50
Barley.....	2.25	4.00

Bituminous—There has been an improvement in buying here but deliveries have been slow on account of the labor trouble in the harbor. Buyers are in a better frame of mind regarding prices and stocks are considerably reduced. The strike which is now in its seventh week has taken just that many weeks' supply of coal from the local market and consequently bins are nearly bare.

Indications point to a busy market as soon as there is a settlement between the private boat owners and their workers. At present all proposals are off and both sides say they are in the fight to a finish. In the meantime users of coal are running short and it is possible that some of the industries in the Metropolitan district that depend entirely upon receiving their coal supply by water may have to curtail operations or haul the coal from nearby railroad sidings.

Wholesale dealers are pleased by the increase in the number of inquiries being received. Buyers, while interested as usual in the quotations, appear to be just as much if not more interested in the quality of coal to be shipped.

Embargoes on individual shippers have kept stocks at the docks well within the necessary limits, which has enabled all shippers to keep sufficient coal on hand to take care of the necessary requirements of their customers. At the docks on Apr. 9 there were 5170 cars of bituminous standing as compared with 4730 cars a week previous, while the number of cars enroute was 2978 as against 3280 on Apr. 2.

The mines are being operating on about a half-time basis but this seems sufficient to take care of immediate wants. So far there has not been a tendency to stock up but shippers expect that consumers will soon come into the market for larger and more frequent deliveries.

The fuel supply for the railroads and the price question continue to agitate the trade. Producers fail to see any reason why the railroads should not purchase their supply of coal at the same price as is charged the industrial or any other consumer.

Quotations for coal for spot delivery or on contract show several changes from those of last week, and are as follows:

	Spot	Contract
South Forks.....	\$2.90 to \$3.25	\$2.95 to \$3.50
Cambria County		
(good grades)....	2.80 to 3.10	2.95 to 3.25
Clearfield County		
(good grades)....	2.65 to 2.95	2.80 to 2.95
Reynoldsville.....	2.65 to 2.85	2.85 to 2.95
Quemahoning.....	2.75 to 2.95	2.95 to 3.10
Somerset County		
(best grades)....	2.75 to 2.95	2.95 to 3.10
Somerset County		
(poorer grades)...	2.25 to 2.50	2.50 to 2.75
Western Maryland.	2.25 to 2.75	2.50 to 2.75
Fairmont.....	2.10 to 2.35	2.35 to 2.50
Latrobe.....	2.10 to 2.25	2.25 to 2.40
Greensburg.....	2.35 to 2.40	2.35 to 2.60
Westmoreland 1-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-		
-of-mine.....	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite trade improved. Mines on full working time. Dealers buying heavily. Retailers using advertising methods. Spring business fair, with public in no hurry to buy. Some suggestions of labor trouble. Summer outlook not promising. Stove and nut in good demand, but pea difficult to move. Retail cash plan fails. Bituminous quiet. Good coals in demand. Railroads buying little fuel pending price discussion. Some commercial contracting.

Anthracite—The improvement in market conditions is probably best shown by the change in the working schedules at the collieries. A few weeks ago the big companies were working three days a week and storing some of the production at that. Now they are planning for six full working days a week for the entire month, or at least until some impression can be made on the mass of business that has accumulated so rapidly. Of course, the sudden and changed conditions came about through the announcement on the last day of last week that the Governor of Pennsylvania had been convinced that the operators were justified in the plan of advancing prices 10c. per ton for five months commencing May 1.

Undoubtedly the dealers are buying more coal than they are selling, and it may be that the present rush of business is not as substantial as appears now. Many retailers report receiving only a fair number of orders and that they call for a smaller tonnage than in former years. They claim their customers are evidently basing their supposed requirements on the past winter's consumption, which in all cases was far below normal.

A number of shippers report having about sold their output of egg, stove and chestnut for the month of April, and there is no doubt of it. It is also quite possible that the dealers will be busier in May than during the present month. Talking with several of the largest operators we learn that the prospects, at least up to the middle of June, are good. We are unable, however, to find any in the trade who predict anything but a very dull summer.

Even the smaller operators, those with high-class coal especially, are apparently taking a more optimistic view of market conditions and several have ceased to actively canvass the trade for orders for shipment of family sizes this month. Pea, though, is troublesome to all and will continue to be so until some change is made in the price. Stove and chestnut at a cost of \$1.50 and \$1.60 are the more economical household sizes, and the public knows it and is accordingly passing pea by.

The large companies are holding firmly to their \$4.80 price and storing heavy tonnages of this size. We hear of several of the smaller operators cutting the price on pea, yet without making substantial sales. Pea coal was never bought heavily in the market during the spring months, even when prices were much lower, and it will be interesting to watch developments, for we cannot see now how six days' production can be cared for. The dealers gener-

ally realize that something must be done by the operators later in the season to move this size and are buying sparingly, as they believe they may be able later to stock up on this size at a more favorable price. Locally stove coal has the call just now, and while few need business for egg and nut, it is stove that is in the shortest supply in the yards.

The steam trade is being well taken care of now. With the collieries working the entire week the big companies are beginning to receive sufficient buckwheat and rice to meet the current demand, which up to the past week was somewhat short and necessitated taking coal out of storage. One other result of this increased production has naturally been a still further accumulation of barley coal, which is now going into the storage yards in greater volume than ever.

Many of the larger companies are still working on their contracts for steam coal and while many of them have been signed, they have a great number still outstanding. The consumers are in no hurry whatever to sign, as with buckwheat at a price of \$3.40 many of them are considering the advisability of turning to bituminous coal, which can now be had on contract terms quite favorable.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

Line	Tide	Line	Tide
Broken.....	\$5.95 \$7.80	Buckwheat..	\$3.40 \$4.45
Egg.....	5.85 7.70	Rice.....	2.75 3.65
Stove.....	6.10 7.95	Boiler.....	2.50 3.50
Nut.....	6.20 8.05	Barley.....	2.25 3.15
Pea.....	4.80 6.40		

Bituminous—There is no change of any moment in the soft coal trade. All mines are working on a restricted basis, just turning out sufficient coal to meet the orders in hand. The only real demand is for the better coals. The call for these grades still continues actively from New England territory.

Producers receive numerous inquiries from consumers asking in regard to contracts, but in proportion to the amount of business closed it would appear that the consumer is merely "shopping around" in an endeavor to find out the state of the price market. In the cases of contracts that have been closed very few of the buyers are taking the amount of coal asked for in the contracts, as the state of industry in this district is as yet far from satisfactory, although the greatest optimism is expressed that a few months will see a general resumption in all lines.

Prices remain firm and it is only in occasional instances that one hears of any recession. The following table gives a fairly accurate idea of the price situation:

Georges Creek Big Vein.....	\$3.00 @ \$3.10
South Fork Miller Vein.....	2.95 @ 3.10
Clearfield (ordinary).....	2.70 @ 2.90
Somerset (ordinary).....	2.60 @ 2.80
Fairmont lump (ordinary).....	2.40 @ 2.50
Fairmont mine-run.....	2.20 @ 2.35
Fairmont slack.....	2.10 @ 2.25

BALTIMORE

Bituminous market remains spotty, with contract making light and offerings in open purchasing considerably off the general contracting price. Gas coals particularly weak. Anthracite men busy and spring orders heavy.

Bituminous—Soft coal is spotty and the tendency is toward weakness. The local market has little to offer in the shape of encouragement for immediate trading. The future holds out great promise, however, and the faith of the coal men in a coming business revival and for a big export when more bottoms are available remains unshattered. While quotations on good coals awhile continue on a mine basis of from 30 to 70 cents off the old Government maximum rates in many cases, there is strong adherence to these prices when quoting on contract. Operators of mines where the better grades of coal are produced refuse to consider any large volume of future business at less than the old maximums, and already some of the mine owners are asking for more.

Gas coals are particularly weak, due to the fact that many war industries that had used the fuel are now out of the market. At times these coals can be bought below the \$2 mark, mine basis. Reports from western Maryland and West Virginia operations are to the effect that the daily output is running only to about 40 to 50 per cent. of capacity, and that

the tendency is to concentrate on mines producing better grades of coal. The Georges Creek and Upper Potomac regions, in which railroad fuel orders have in the past amounted to 2,000,000 tons annually, are just now barely running.

Anthracite—Hard coal dealers are enjoying a period of happiness. The cut of 40 cents a ton in the winter schedule and of 25 cents additional for ten-day cash payments, has spurred the public to order their coal. Many dealers are rushed, and there is a belief that a large volume of orders will go on the books during April and May. The local outlook—should there be no further freight-rate increase—is that the present retail price list will be maintained until July 1, despite the plan to advance wholesale prices 10 cents a month dating from May 1. In July the retail price will probably be advanced 25 cents a ton to cover advances, and it may be that this price will be the ruling price for next fall and winter. Such a schedule would bring coal to 15 cents per ton cheaper than last winter. The city of Baltimore has asked for bids on 11,000 tons of anthracite, the bids to be opened Apr. 23. Little contracting is reported.

Lake Markets

PITTSBURGH

Operations slightly under 50 per cent. Pittsburgh market holds relatively well. High-grade byproduct and gas coals firm.

Coal-mining operations in the entire Pittsburgh district are showing an average of a trifle under 50 per cent, which is an improvement over operations at some earlier times in the year. The market is hardly as strong as it was a week or a fortnight ago, but it has softened very little. Considering the general unsettlement in the coal trade of the country, and the warm controversy at Washington over prices for railroad fuel and the manner in which purchases should be made, the Pittsburgh coal market is really showing a remarkable degree of strength. This is the more noteworthy by reason of the fact that there is by no means complete co-operation between the producers. For instance, some prominent independent operators openly state that they do not intend to be guided, in their sales policy, by what the leading interest desires or states to be its own policy, while some operators, particularly in the Panhandle district, have freely cut prices to the extent necessary to secure the volume of business they desired.

With all this, the Pittsburgh market maintains a moderately even keel, while as to high-grade coking and gas coal it is absolutely firm at \$2.35 for mine-run. Operators admit that these prices may possibly yield in time, but the important fact is that even up to this time they have not yielded. The railroads have not bought a great deal of coal in the Pittsburgh district, and on what they have bought they have paid what should be considered high prices in view of reports from Washington as to the low prices at which coal has been picked up by the Railroad Administration. For Panhandle steam coal, for instance, the Pennsylvania lines are understood to have paid \$2.15. There is no regularly quotable market on domestic coal, as transactions are light, and besides this there is a wide range in the quality of coal desired by different retail dealers, some preferring to handle high-grade gas coal while others take decidedly indifferent steam coal, analysis being practically no consideration.

Some leading operators, particularly those with the better grades of coal, are desirous that the old fashion of quoting "Pittsburgh coal" at one price only should be absolutely discarded, and that prices should be quoted according to quality and character. The high-grade coking and gas coals, it is pointed out, ought to be conserved for their proper uses and should command a higher price than ordinary steam coal, while even in steam coal there is quite a range of quality.

We quote the market as follows: Good grade byproduct coal, mine-run, \$2.35; high-grade gas coal, mine-run, \$2.35; 1-in., \$2.50@2.60; 1 1/2-in., \$2.60@2.70; slack, \$2.25@2.35; steam coal, slack, \$2@2.10; mine-run, \$2@2.35, all net ton at mine, Pittsburgh district. Some high sulphur Connellsville coal has been sold at low prices, but that is altogether outside the district.

TORONTO

Coal business continues generally dull. Consumers ordering from hand to mouth. Toronto dealers organize. Office of fuel controller likely to be continued.

The demand for coal both for domestic and industrial uses continues light, from causes previously indicated, and dealers are doing very little business. The situation has been unchanged for some weeks, orders being merely for temporary requirements as a rule. The public has so far shown little disposition to follow the advice of the Fuel Controller and place their orders early, apparently hoping that prices may fall in spite of assurances to the contrary. With the object of promoting friendly relations, avoiding misunderstandings among the trade and keeping in touch with conditions, the local dealers have organized as the Toronto Coal Dealers' Association with Frank Rogers as president; Charles McGill, vice president; and James Hardy, secretary-treasurer. It is considered altogether probable that in view of the petition of the Canadian Associated Coal Dealers to that effect the Government will continue the office of Fuel Controller for another year.

Quotations for short tons are as follows:

Retail:	
Anthracite egg, stove, nut and grate.....	\$11.50
Pea.....	10.00
Bituminous steam.....	8.25
Slack.....	7.25
Domestic lump.....	10.00
Cannel.....	13.00
Wholesale f.o.b. cars at destination:	
Three-quarter lump.....	6.25
Slack.....	5.25

BUFFALO

Still waiting for a stir. Slight improvement here and there. Government uncertainty does harm. Anthracite to be short again.

Bituminous—The trade goes on much the same. Jobbers get some orders, but as a rule the consumer reports that he has a month's supply or more. When that is gone there must be more buying, so the trade waits for that. It is a long delay, but it may be made so speedily if the car supply should run short. So the jobbers try to make the most of the situation. They find some improvement, but as a rule the situation does not change. It is likely to be midsummer before trade is good. In fact we may be well satisfied if it comes then.

Much uneasiness is shown over the railroad complications. Sales to the roads are few and payment is uncertain. No very satisfactory trade is possible till the roads are in better shape. While the people here do not say the roads should go back to the old management, the idea is that a firmer basis would be reached if something of the sort were ordered. The emergency is past, and if the plan of handling cars as one body were continued the Government control might go. Then an adjustment on a paying basis could be made. It will never happen now.

Bituminous mining is slow. Some mines are running only about two days a week and none can be said to be really active. This increases the cost of the coal and satisfies nobody. For all that, the mining capacity increases slowly, in the face of such poor prospects.

The firm condition of prices continues. That seems to be the last hope of the trade. If price cutting is increased much the situation will become serious. Some reductions are made, but the coal generally is not good. Quotations remain on the basis of \$4.65 for thin-vein Allegheny Valley, all sizes; \$4.45 for Pittsburgh and No. 8 lump; \$4.20 for same mine run or slack; \$5.65 for smithing and smokeless; \$5.60 to \$6.10 for cannel; all per net ton, f.o.b. Buffalo.

Anthracite—The demand increases and the supply falls off. Shippers are saying that a shortage next winter is certain. Consumers will not buy fast enough to keep the mines in full operation, and when the fall rush sets in they cannot be run fast enough to meet the demand. It is time that consumers realized this, but only a few do. Already some of the lake shippers are turning all their receipts to the rail and will load no more vessels till navigation opens. The prospect of no sailing till late this month continues.

The prices of anthracite to the Buffalo market remain as follows through April:

	F.o.b. Cars Gross Ton	At Curb Net Ton
Grate.....	\$8.55	\$19.25
Egg.....	8.45	10.00
Stove.....	8.70	10.10
Chestnut.....	8.80	10.50
Pea.....	7.00	9.05
Buckwheat.....	5.70	7.75

CINCINNATI

Conditions quiet, and no great demand expected in immediate future. Prices being maintained.

The general condition of the coal trade in Cincinnati remains extremely quiet, with the possible exception of the fair demand for steam grades. While the more optimistic dealers describe the market conditions as fair, the majority of them qualify the statement by saying that it is fair, considering all the adverse factors affecting the demand at present, by which they mean the general let-up in industrial pursuits and the early opening of spring, which naturally affects the demand for fuel. Then, too, there is the fact that large quantities of coal were laid in by consumers in the expectation of a severe winter, which failed to materialize, thus leaving coal bins and cellars well stocked. There is every likelihood that this condition will have a serious effect on the demand for domestic grades for the remainder of the spring and summer at least, and that the sales in this branch will be far below normal during the coming season. Prices remain firm, although small producers, in some cases, have taken orders below the market, presumably in order to maintain their organizations.

CLEVELAND

Demand for No. 8 coal for the lake trade is coming out surprisingly strong, and operations in eastern Ohio are rapidly being speeded up. No. 8 1-in. lump for lake shipment is holding firm at \$2.35 and \$2.40 f.o.b. mine, about 25 and 20c. under last year's price, while northern Ohio offerings are as low as \$1.90.

Bituminous—Operators in the No. 6 and the No. 8 districts of eastern and southern Ohio evidently are cleaning up their accumulations, for offers of low-grade coal this week have been the most numerous in a long while. Some blocks have been offered at as low as \$1.90, and it is believed \$1.80 could be done, in a pinch. This is the lowest the bituminous market has sagged since the armistice. High-grade No. 8 1-in. lump seems to be plentiful at around \$2.20, and some retail dealers claim to have offers of this grade at \$2.15 and \$2.10. Outside of the block of lake coal that went at \$2.35, no more No. 8 1-in. lump for the head of the lakes is reported closed. Most No. 8 operators are believed to be holding out for \$2.40, though on a large percentage of the early shipments the price is being left for adjustment later.

Operators appear to be completely at sea in regard to railroad buying. That the Railroad Administration will drive a bargain shortly, or rather attempt to drive one, is the general belief. Return of the railroads to their corporate owners is looked for around July 1, and it is assumed that inasmuch as they must be turned back in worse shape physically than they were in when taken over, Railroad Administration officials will seek to offset this partially by low-price contracts for coal and steel rails. Ohio operators are largely dependent upon the railroad fuel business, but appear determined to hold out against a deep cut. A reduction of 20c. in contract railroad fuel is one prediction, and it is the only one hazarded here.

Larger steam-coal users still are flirting with proposals but have not yet done any worth-while buying. Another 30 days, however, will see some fair-sized tonnages contracted for, it is believed. Stock piles are wearing down, and industrial buyers appear only to be awaiting action by the Railroad Administration in order to satisfy themselves as to price. Domestic demand for bituminous, and for anthracite and Pocahontas as well, has faded to virtually nothing. This is to be expected at this time of the year.

Lake Trade—Demand for No. 8 coal for lake shipment has exceeded the hopes of even the most optimistic, and preparations are under way at a number of mines to get on to full-time as soon as possible. By Apr. 20 fully 500,000 tons will have gone over Lake Erie car dumpers, it now appears. Few cargoes, if any, however, will be unloaded at the head of the lakes before May 1. In some quarters there is specula-

tion whether fuel coal put down on the docks last summer will be marked down in price in order to move it. Lake carriers that held winter grain cargoes are being freely moved at Lake Erie ports in order to take on coal cargoes. Insurance rates on coal for the 1919 season have been fixed at 7½c. per 100 tons—the same rate as last season.

Prices of coal, per net ton delivered in Cleveland, are:

Anthracite:	
Egg.....	\$10.85 @ 10.95
Chestnut.....	11.00 @ 11.15
Grate.....	10.90 @ 11.05
Stove.....	10.90 @ 11.05
Pocahontas:	
Lump.....	7.50
Mine-run.....	7.20
Domestic Bituminous:	
West Virginia splint.....	7.05 @ 7.15
No. 8 Pittsburgh.....	6.10 @ 6.30
Massillon lump.....	6.90 @ 7.05
Steam coal:	
No. 6 slack.....	4.40 @ 4.50
No. 8 slack.....	4.70 @ 4.85
Youghiogheny.....	4.90 @ 5.05
No. 6 mine-run.....	4.40 @ 4.50
No. 8 mine-run.....	4.70 @ 4.85
No. 8, 1-in.....	5.35 @ 5.50

DETROIT

With buyers indifferent and sales small in volume, the Detroit market is sluggish.

Bituminous—Complaints are still coming from jobbers and wholesalers that the Detroit market is apparently devoid of a buying demand and that all attempts to arouse interest among customers seem to be without result. In view of the attitude of the buyers and the greatly diminished production of the mines, which is a sequence of similar curtailment of business in other markets, jobbers say that matters are seemingly shaping themselves for development of a serious deficiency in bituminous supply before the end of the year.

Unusually large supplies of bituminous in the reserves of manufacturing plants and the storage yards of the retailers constitute the obstacle which the jobbers encounter in their efforts to sell coal. The manufacturing plants are not burning as much coal as under normal conditions. Their reserves contain accumulations of low-grade coal, and jobbers say there seems to be an unwillingness to place further orders until the stock of inferior quality has been consumed. Among the retailers there is an easing off in domestic demand that causes hesitation in buying, particularly as many of the retailers' stocks not only include much low-grade coal but an undesirably large proportion of small coal, such as slack and mine-run.

Quotations on domestic lump, according to the jobbers, are being made at the Fuel Administration prices, though it is admitted that offerings of mine-run and slack have been made on a basis of \$1 a ton or more below the figures named by the Government. In negotiations relating to contracts, the Government prices are quoted.

Anthracite—Even the prospect of an advance in price of anthracite on May 1 appears ineffective to stimulate a broad demand from householders. Orders are largely for small quantities sufficient to fill out stocks until warm weather. Retail dealers are striving to encourage early buying. The supply of prepared sizes seems sufficient for the present needs of buyers.

Lake Trade—Vessel owners and shippers of coal by lake routes show no eagerness to get the movement under way. The mines are sending coal to lake loading docks in fair volume and carriers are being loaded, but few or none of these cargoes will be delivered before the last week in April.

COLUMBUS

The Ohio coal trade continues quiet. Contracting is still held in abeyance to wait for price adjustment. Railroads are in the market for a considerable tonnage. Lake trade will be late in opening.

The coal trade in Ohio continues to show little activity in most directions. Because of the lateness of the season the domestic trade is quiet. Steam business is held up because of uncertainty of quotations and there is little prospect of an early opening of the lake trade. Taking it all in all, the industry is marking time and producers as well as shippers are not anxious to go ahead under present unsettled conditions.

The contract situation remains unchanged. Because of the unsettled price for railroad fuel coupled with the uncertainty of the future, purchasers are not inclined to contract for any large tonnage.

As a result comparatively few contracts have been renewed and there are only few that are close to closing. Some of the agreements leave the price blank to be fixed when quotations are settled. Some lake contracts have been made in the same manner. But when it comes to getting down to signing at a certain figure, many difficulties are encountered. It is true that there are quite a few inquiries received and that some quotations are made, but the main volume of business is held up. There is considerable spot coal to be had at less than Government prices and consequently no one is anxious to contract.

The screenings situation is unchanged. Owing to lack of demand there is no market for screenings and an oversupply is reported from every mining field. This is curtailing the production of lump to a large extent.

The lake trade is not showing much signs of opening. There is a belief that it will not open much before May 15, if at that time. Vessel rates and contracts for lake tonnage are still held up because of uncertainty as to price. Reports show that a considerable tonnage is carried over at the head of the lakes and that there is no desire to hurry matters.

Production is rather low in most of the producing areas of the state. Railroad consumption is not large and factories are not getting back to normal business very fast. Consequently, little increase is anticipated in the near future.

LOUISVILLE

Domestic slightly more draggy, but steam grades in better demand. Inquiries coming freely, and a good deal of contract making being done on steam. Prices firm and stronger.

Domestic grades are somewhat draggier than they have been, if such a thing is possible and the retailer is not doing much business. However, the jobbers and producers are managing to keep fairly busy even without any great rush for domestic. As mine-run for steam use is coming better all the time, and the demand for nut and slack should reach a point shortly where it will be a question of disposing of the resulting lump, instead of a question of disposing of the screenings as has been the case for some months.

Inquiries are coming in freely, and operators are now quoting prices on mine-run and nut and slack for annual delivery, although no one is willing to quote much domestic business. It is felt that unless stocking is taken up by the retailer and domestic consumer that the demand for domestic sizes this fall will exceed the supply, resulting in a market higher than a "cat's back." Prices are quoted on domestic for April, May and June delivery, but beyond that period the average producer or jobber will not take chances.

Mines in eastern Kentucky are reported to be operating on a basis of about 65 per cent., with the western Kentucky mines doing a little better than 50 per cent. of full time.

Coal prices are firmer than they have been, although there is some cheap spot coal being heard of at frequent intervals. Good eastern Kentucky egg and lump is selling in many instances at 25c. a ton over other quotations, this being especially true in some sections of the Harlan, Straight Creek and Jellico districts. As closely as can be ascertained, prices for the state, short ton, including brokerage fee to be deducted if sold through jobber, are as follows:

	Eastern Kentucky	Western Kentucky
Block and egg.....	\$2.85@3.00	\$2.60
Run-of-mine.....	2.20@ 2.50	2.35
Nut and slack.....	2.00@ 2.10	2.05

Western Kentucky is doing little price cutting, and while stories are heard relative to nut and slack selling at \$1.75 to \$1.85, investigation generally proves that there was an error somewhere, or that it was some spot coal that had to be disposed of to escape demurrage. Some eastern Kentucky mine-run is selling as low as \$1.90, it is reported, but going out and finding it at that price is something else again.

Inquiries are coming in nicely from the southern railroads, the Southern, Seaboard, Louisville & Nashville, Big Four and any number of Georgia and Alabama roads asking prices. Operators and jobbers are sticking mighty close to former maximum Fuel Administration prices in quotations, and there is no prospect whatever for a wholesale cut in prices this spring.

Several producers and jobbers report that business after May 1 will be all that

can be desired, and that today business is better than it was last year. Domestic is a problem, but steam should move. Lake inquiry is opening nicely.

BIRMINGHAM

Domestic coal being readily taken, but steam consumers are manifesting little interest in the market, only caring for current needs. Mines operating on a three- and four-day schedule.

There is a decidedly good tone to the domestic coal market in this district, and distributing agencies report that all the available coal of the best grades in being taken readily, and many dealers are signing contracts for their year's supply. Prepared sizes of the lower grades are also coming into favor, and there is a satisfactory demand for the medium-grade coals. Quotations are as follows per net ton mines:

Big Seam lump.....	\$2.90
Carbon Hill lump and nut.....	3.15
Corona lump and nut.....	3.40
Montevallo lump.....	5.60
Cahaba and Black Creek lump and nut	3.85@4.50

Steam buying is confined to small orders, consumers buying in the spot market not taking more than current requirements. Very little contracting is being done as yet. Inquiries are being received by local sales agencies which give promise of resulting in some large export orders being booked in the near future. The last named Government schedules are still ruling on steam coal, which are as follows per net ton mines:

	Mine- run	Pre- pared	Screen- ings
Big Seam.....	\$2.45	\$2.75	\$2.40
Cahaba and Black Creek.....	3.45	3.75	3.10
Pratt and Corona.....	2.85	3.05	2.45

Mines in the Birmingham district, aside from one or two producing high-grade domestic coal and some employing convict labor, are working on a schedule of three and four days per week.

Coke

CONNELLVILLE

Price level unchanged. Open pig-iron market. Continued decrease in coke production.

The coke market is certainly no stronger as to prices, but it is hardly weaker to any material extent. Possibly the market had already got down as low as it could go, with present costs and with the disposition of operators to curtail production if they cannot get their prices. One difficulty is that blast furnaces are going out so rapidly that it is difficult for coke production to decrease fast enough to maintain the pace. Each week seems to show a slight increase in the rate at which furnaces go out of blast. Whatever may be the outcome of the present uncertainty as to how steel prices are to be made in future, whether the Industrial Board will continue its efforts and whether the Railroad Administration will formally indorse reduced prices if made, the pig-iron trade has already established what it is going to do. It is going to have an open market for pig-iron, prices being allowed to go where they will and furnaces going out of blast whenever they cannot sell their output at a profit. The blast furnaces are used to that sort of thing, having always had an open market prior to the war-time price control, while the steel industry has nearly always had a controlled market. Coke operators are in sympathy with this blast furnace policy, and quite naturally, since an open market developed for coke a few days before Government control came off, while pig-iron remained as a controlled market.

The majority of adjustment contracts were settled for April shipments of furnace coke at \$4.25, operators having readily yielded from their original demand of \$4.50. Odd lots of furnace coke may readily be picked up at \$3.75, involving standard grades, off grades not being salable at all except as fuel. Many producers of standard foundry coke are holding at \$5.25, while two or three still quote \$6 and one has actually sold a few carloads at \$7, to consumers unwilling to change brands. Ordinary foundry coke can be picked up at \$4.50, which seems to be the absolute minimum. The market is thus quotable

as follows: Furnace, \$3.75@4.25; foundry, \$4.50@6, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Apr. 5 at 172,350 tons, a decrease of 13,310 tons. Production has continually and sharply decreased, as the Connellsville region experiences a greater decrease in demand than the total decrease in coke consumption, because the byproduct ovens have decreased but little.

Buffalo—It is still impossible to sell fine fuel coke in this market and the commercial grades are as dull as ever. Until the furnaces in this district buy ore for the season's use the coke movement will be light. Furnaces are not running at all strong, though they would have started before this but for the hitch in the iron trade. Connellsville shippers quote 72-hour foundry coke at \$7 to \$7.25, 48-hour furnace at \$6.60 and off grades at \$6.10. Vessel owners are getting uneasy, but do not dare to start till ore is offered.

Middle Western

GENERAL REVIEW

Certain amount of buying activity leads to slight improvement in Middle West producing districts. Railroad fuel controversy comes in for much criticism. Increased buying anticipated.

A curious situation has developed; operators and jobbers alike are experiencing the same thing—namely, plenty of orders on Monday and Tuesday, and not an order on Wednesday. Exactly what is to account for this is hard to determine, but the consensus of opinion has it that stock piles are running low, and consequently there is a certain amount of buying. Another opinion is that certain interests are feeling uneasy over the labor situation, and are preparing against the eventual disturbance to the market by buying a three to four weeks' supply.

Taking all things into consideration, the market shows an improvement over previous weeks, although conditions are very far from satisfactory. This small improvement is felt by operators in all the coal-producing districts of the Middle West. The district most benefited, as usual, was southern Illinois, but both the Springfield district and northern Illinois report better markets. The Indiana fields have had a little better running time, especially some of the mines on the Vandalia that have secured railroad orders.

There is considerable, in fact much more than considerable, criticism in these parts against Mr. Redfield and his conferees in the railroad fuel question. It will be remembered that Redfield was connected with the "Eastland" disaster, which took place in the Chicago River some years ago, and that this connection of Mr. Redfield's did anything but add to his reputation. It is felt here that the railroad fuel question has become too serious to leave to politicians, and should be decided by a committee who are familiar with at least the basic principles of railroading and coal operating.

On Friday, Apr. 11, the papers all published the news that the railroad employees are to receive another raise in their salaries. Inasmuch as practically all of the roads are hard up for funds, this additional burden added to their shoulders will eventually, and perhaps very shortly, result in a substantial increase in rates. The operators and jobbers are anticipating a stronger coal market from now on, as many people will come into the market to purchase coal before the proposed advances go into effect.

CHICAGO

Pocahontas coal in great demand. Steam situation better. Prices holding up well.

Everything points, at this writing, to a complete reinstatement of high-grade eastern coal in this city. It was reported that one dealer on the North Side sold 500 tons of southern Illinois lump, bought last year, at a loss of approximately \$1 per ton, in order to make room in his bins for the eastern coal his trade demanded. Pocahontas coal is in great demand, and it is said that the prepared sizes of this fuel are selling at from \$3.50 to \$3.75 per ton, f.o.b. mines. This coal takes a rate of \$2.60 to Chicago, making Pocahontas, on the whole, a pretty expensive fuel. The public are not taking at all well to the increased cost of anthracite fuel, and, as a direct result, there

has been a good market on coke, and on certain high-grade bituminous coals, which can be used as substitutes for hard coal. The steam situation appears a trifle better, as there is more demand than last week. Prices, considering everything, are remaining remarkably firm, as but few cuts have been reported, and these, as usual, on inferior grades.

Prices per ton are as follows:

ILLINOIS			
Southern Illinois			
Franklin, Saline and Williamson Counties, etc.	F.o.b. Mines	Rate to Chicago	
Prepared sizes	\$2.55@2.75	\$1.55	
Mine-run	2.35@2.50	1.55	
Screenings	1.85@2.20	1.55	
Central Illinois			
Springfield District			
Prepared sizes	\$2.55@2.75	\$1.32	
Mine-run	2.35	1.32	
Screenings	2.05	1.32	
Northern Illinois			
Prepared sizes	\$3.25	\$1.24	
Mine-run	3.00	1.24	
Screenings	2.75	1.24	
INDIANA			
Clinton 4th Vein District			
Prepared sizes	\$2.65@2.75	\$1.27	
Mine-run	2.35@2.45	1.27	
Screenings	2.05@2.25	1.27	
Knox County Field			
Prepared sizes	\$2.65@2.75	\$1.37	
Mine-run	2.35@2.45	1.37	
Screenings	2.05@2.25	1.37	

MILWAUKEE

Market continues inordinately slow, with little prospect of interesting consumers in supplies for the future. Higher anthracite predicted.

There is absolutely no interest in coal in this part of the country at present, as far as consumers are concerned, and the prospect is that there will be little or no early ordering of fuel supplies by householders. Dealers, however, are naturally concerned as to the future of prices, but they are completely befogged and disinclined to make predictions. It is being advanced that a raise of \$1.50 per ton on hard coal is among the possibilities, because of increased mining rates and higher freight charges. The customary advance of 10c. per ton from May to September will combine in the lifting process. On the other hand, it seems to be conceded that bituminous coal will be slightly lower, but no reasons are given for this conclusion except the large stocks on the docks.

Prices for coal and coke of all grades continue unchanged, as follows:

Domestic		Short Ton
Anthracite—		
Egg		\$12.20
Stove		12.40
Nut		12.50
Pea		11.00
Buckwheat		10.60
Bituminous—		
Pocahontas mine-run	\$8.15	
Hocking, screened	7.90	
Youghiogheny, screened	7.90	
Pittsburgh, No. 8, screened	7.90	
West Virginia, screened	8.40	
Splint, screened	8.40	
Kentucky, screened	8.40	
Illinois, screened	7.25	
Coke—		
Solvay, large sizes	\$11.50	
Solvay, small sizes	10.25	
Smithing	8.40	

Steam—

Youghiogheny, Hocking and Pittsburgh	
No. 8, screened	\$7.18
No. 8, pile run	6.93
No. 8 screenings	6.68
West Virginia, Kentucky and splint	
Screened	7.68
Pile run	7.43
Screenings	7.18
Illinois and Indiana, screened	6.50
Pile run	6.25
Screenings	6.00
Smithing	7.68

ST. LOUIS

No demand for either steam or domestic. Some little movement of coal to country points, but in a general way the situation is about as quiet as it can be, with little prospect of anything better immediately.

The general spring storage of domestic has not yet started, but there are indications that this will get under way the coming month in pretty fair shape. Little smokeless has come and there is no demand. The demand for smokeless in this territory does not look good for the coming season. As far as Arkansas is concerned, that seems to be even farther away than the smokeless, and it is likely there will be no Arkansas used at all. The price of Arkansas anthracite almost equals the price of Pennsylvania anthracite, and Pennsylvania will always be preferred.

The coke situation is not encouraging. The price is right, but the early buying movement is not under way to the extent that it has made any inroads on the mountainous supply of coke on hand.

In the Standard district some mines are getting one or two days a week on commercial and steam business. There is a slight movement of this coal to the Chicago market, and the railroads are taking some, but in a general way the field is as near shut down as it could possibly be in normal times.

The low prices that prevailed in the Standard field are practically a thing of the past, for from now on the operator must get producing cost or put up an indemnity bond to the mine workers to assure them of their wages. That is practically the ultimatum that has been sent out by Frank Farrington, president of the Mine Workers of Illinois.

In the Mt. Olive district conditions are somewhat better with a greater portion of the tonnage moving north. Prices are being pretty well maintained. This is the only district in southern Illinois that is maintaining the former Government prices.

In the Cartersville field of Williamson and Franklin Counties, and also in the Duquoin field, there has been a gradual easing up of orders for domestic sizes, and steam sizes are now in the ascendant. If the demand for domestic sizes continues to ease up it will be only a short time until screenings and the smaller sizes of nut will almost be at a premium. The

northern market, however, promises to absorb a good tonnage of early storage coal from this district. If this is the case, the situation will be much easier. Some mines are getting four to five days a week. Others are only getting one or two and some are idle. The railroad tonnage out of this field is light right now, but indications are that this will continue to grow as time goes on.

The prevailing circular at the present time f.o.b. the mines is:

Williamson and Franklin County Association:	Mt. Olive and Staunton	Standard
Lump, egg and nut	\$2.75	
Washed Nos 1 and 2		
nut	2.85	
Independent:		
Lump, egg and nut	2.55	2.55 Lump and 2.25 egg
Washed Nos. 1 and 2		
nut	2.85	2x3 nut 2.00
Mine-run	2.35	2.20
Screenings	2.20	2.05 1.75
3-in. lump		2.30
2-in. lump		2.15
2x6 egg		2.10

Williamson-Franklin rate to St. Louis is \$1.07; other rates \$0.92.

General Statistics

ANTHRACITE SHIPMENTS FOR MARCH, 1919

The shipments of anthracite for the month of March, as reported to the Anthracite Bureau of Information, amounted to 3,938,908 tons, which exceeded the short month of February, when the shipments were 3,871,932 tons, by only 66,996 tons, or less than 2 per cent.

As compared with March, 1918, when the shipments amounted to 7,276,777 tons, the shipments in March this year showed a decrease of 3,337,869 tons, of 46 per cent. This almost unprecedentedly low record for March shipments of anthracite was unquestionably due to the holding off of consumers and dealers in making purchases, because of the anticipation of a possible reduction in price on April 1.

The statement issued by the Governor of Pennsylvania Apr. 4 has done much to correct this impression and a decided improvement has already been evinced in business for April, with indications that the demand and shipments will continue to improve during the next few months. The public seems to have taken notice of the warning issued by the United States Fuel Administration that unless consumers and dealers lay in their supplies during the summer months there is serious danger of a shortage of domestic coal next winter.

The shipments by companies were as follows:

	March, 1919	March, 1918	Coal Year, 1918-19	Coal Year, 1917-18
P. & R. Ry.	667,229	1,339,051	14,007,057	14,798,496
L. V. R.R.	622,746	1,355,933	13,209,114	14,221,783
C. R.R. of N. J.	309,994	623,611	6,238,053	6,872,635
D. L. & W. R.R.	658,694	1,155,587	10,892,222	12,528,523
D. & H. Co.	671,829	861,253	8,834,560	8,754,117
Penna. R.R.	338,977	519,806	5,094,789	5,643,501
Erie R.R.	451,572	864,968	8,039,908	8,840,579
N. Y. O. & W. Ry.	88,116	199,680	1,837,467	2,065,236
L. & N. E. R.R.	129,751	356,888	3,514,587	4,027,499
Total	3,938,908	7,276,777	71,667,757	77,752,315

Coal and Coke Securities

New York Stock Exchange Closing Quotations Apr. 14, 1919

STOCKS		Ticker	Bid	Asked	BONDS		Bid	Asked
American Coal Co. of Allegheny	(ACL)	45			Cahaba Coal, 1st Gtd. 6s, 1922		90	
Burns Brothers, Com.	(BB)	164		165	Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940		71	
Burns Brothers, Pfd.	(BB)	110		115	Colorado Fuel & Iron, Gen. 5s, 1943		89 1/2	90
Central Coal & Coke, Com.	(CK)	55			Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934		74 1/2	75
Central Coal & Coke, Pfd.	(CK)	63			Consolidation Coal of Maryland, 1st Ref. 5s, 1950		88	88 1/2
Colorado Fuel & Iron, Com.	(CF)	42		43	Lehigh Valley Coal, 1st Gtd. 5s, 1933		96	
Colorado Fuel & Iron, Pfd.	(CF)	105		125	Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933		79 1/2	
Consolidation Coal of Maryland	(CGM)	75			Lehigh Val. Coal & Nav. Con. S. F., 4 1/2s, Ser. A, 1954		90	
Elk Horn Coal, Com.	(EH)	27		27 1/2	Pleasant Valley Coal, 1st S. F. 5s, 1928		80 1/2	
Elk Horn Coal, Pfd.	(EH)			47	Pocahontas Coal & Coke, Joint 4s, 1941		83 1/2	84 1/2
Iceland Creek Coal, Com.	(ICR)	39			Pocahontas Con. Collieries, 1st S. F. 5s, 1957		86 1/2	87 1/2
Iceland Creek Coal, Pfd.	(ICR)	75			Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946		98	
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	60			St. L., Rocky Mnt. & Pac. Stamped 5s, 1955		91	
New Central Coal of West Va.	(NCC)	5			Tenn. Coal, Iron & R.R., Gen. 5s, 1951		87	90
Pittsburgh Coal, Com.	(PC)	49		49 1/2	Utah Fuel, 1st Sinking Fund 5s, 1931		55	72
Pittsburgh Coal, Pfd.	(PC)	86		87	Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953		85 1/2	85 1/2
Pond Creek Coal	(PD)	13		15 1/2	Virginia Iron, Coal & Coke 1st 5s, 1949			
Virginia Iron, Coal & Coke	(VK)	55		58				

* Ex. Div.